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THE IRON AGE

A Review of the Hardware, Iron and Trades.

Published every Thursday Morning by David Williams, Nos. 96, 98, 100 & 102 Reade St., New York.

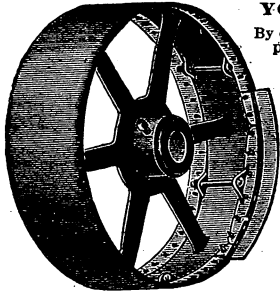
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New York, Thursday, March 2, 1893.

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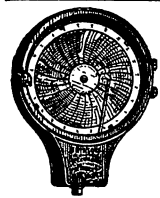


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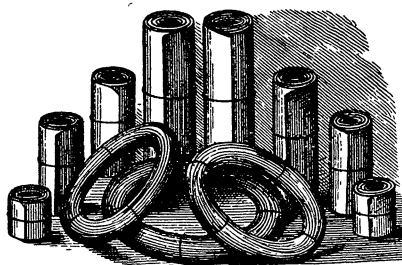
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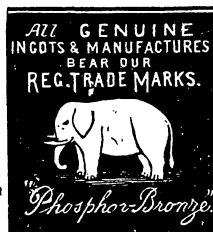
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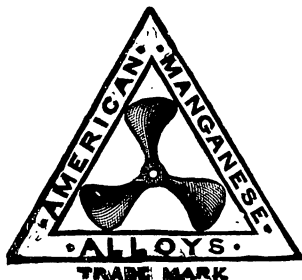
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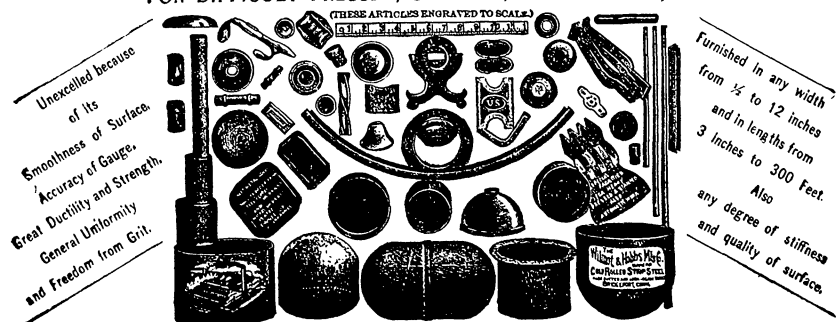
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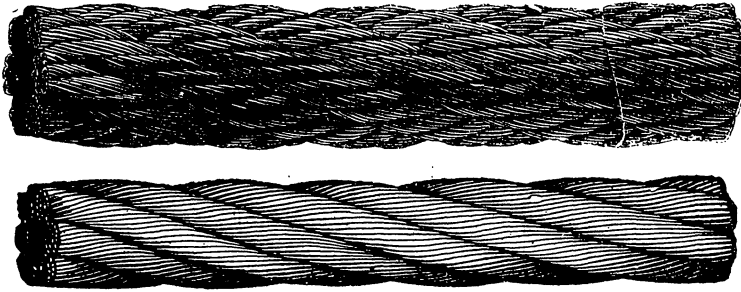
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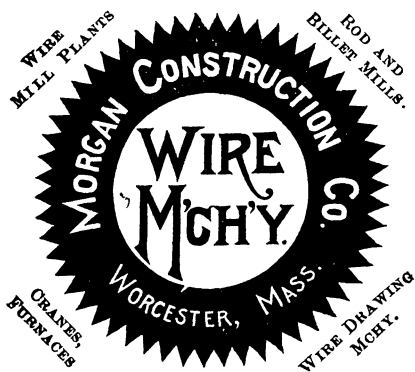
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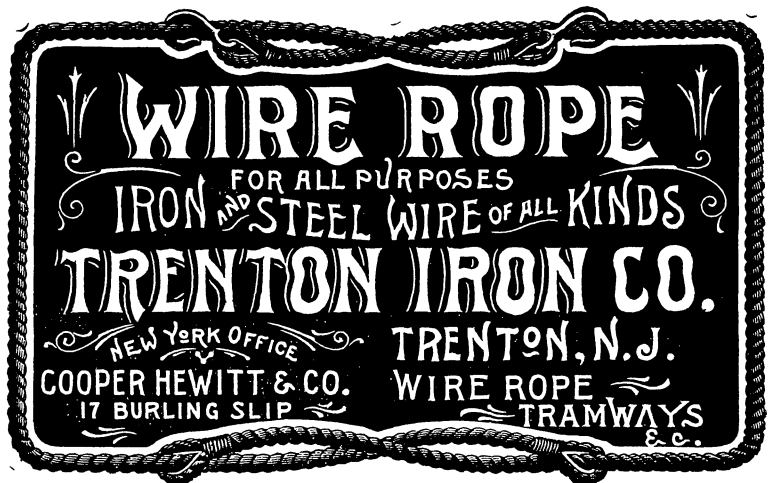
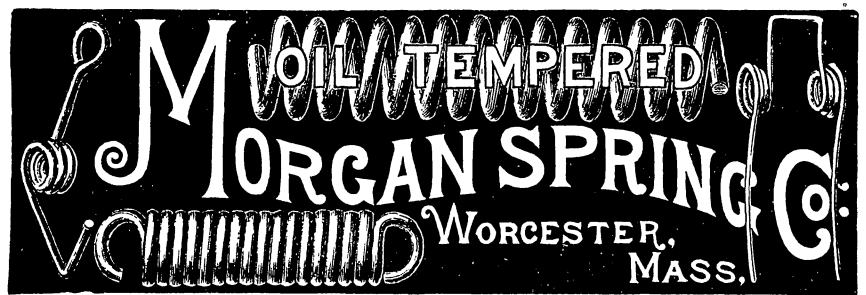
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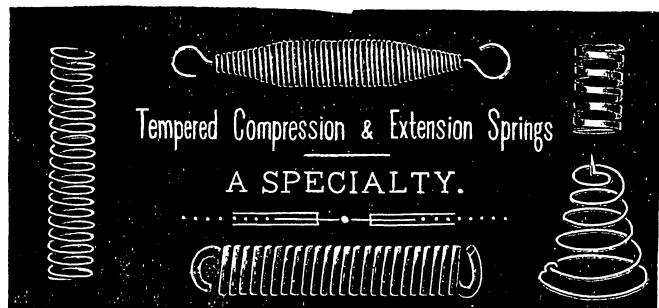
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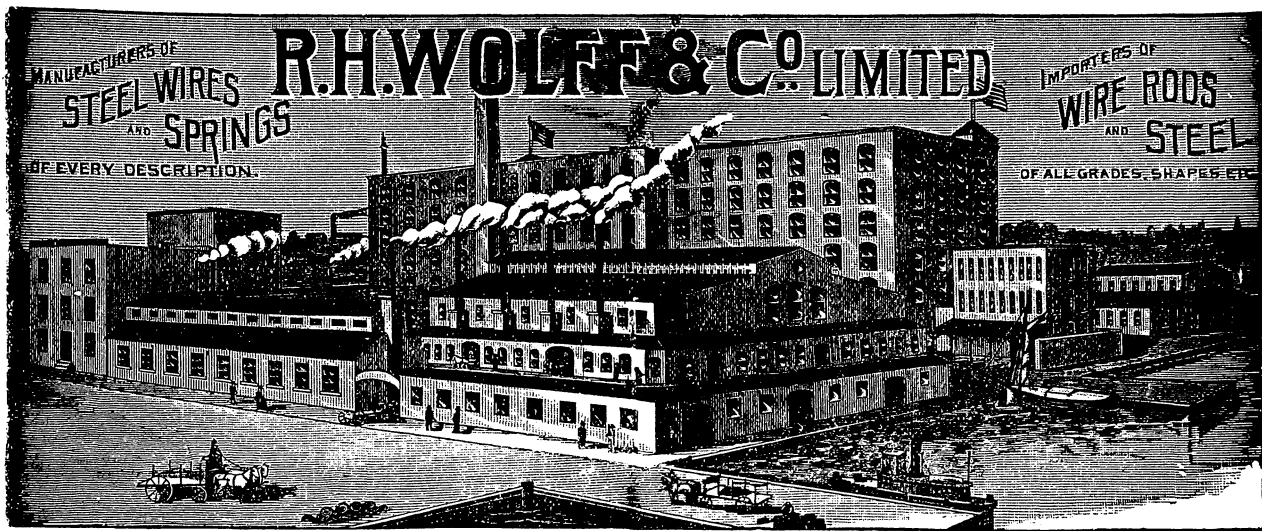
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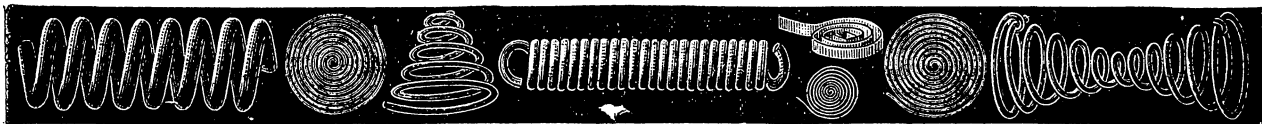
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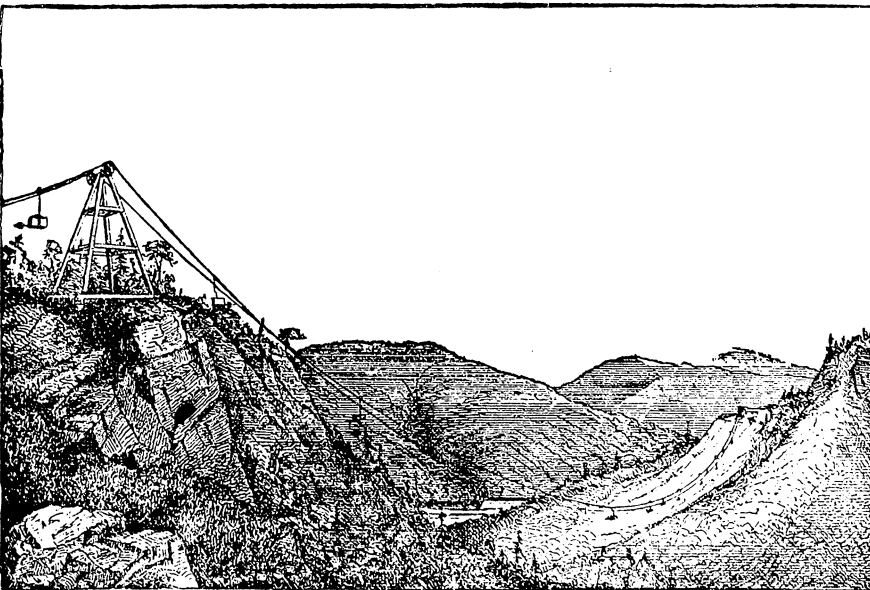
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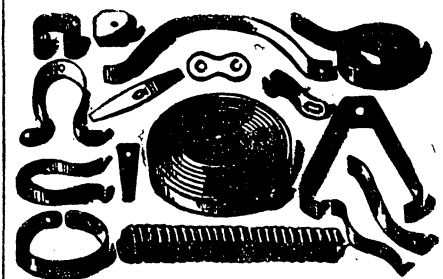
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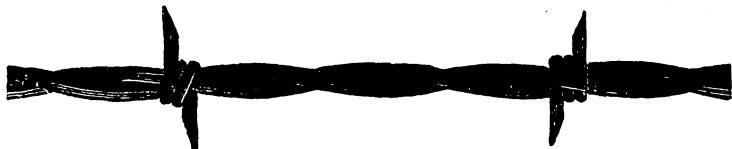
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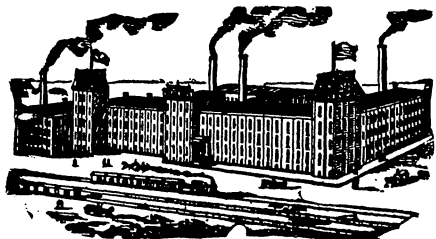


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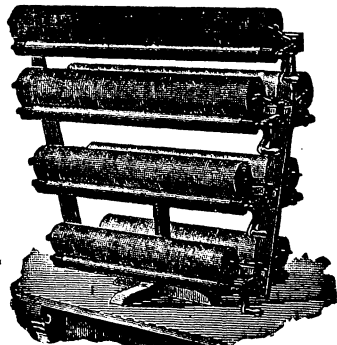
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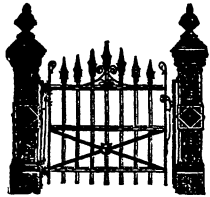
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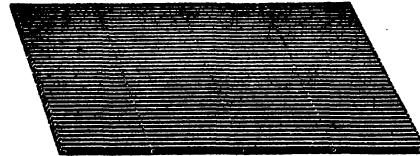
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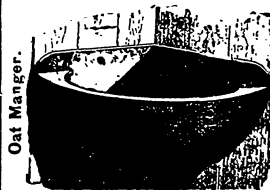
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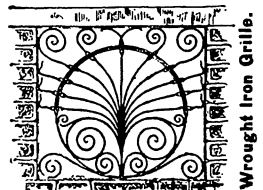


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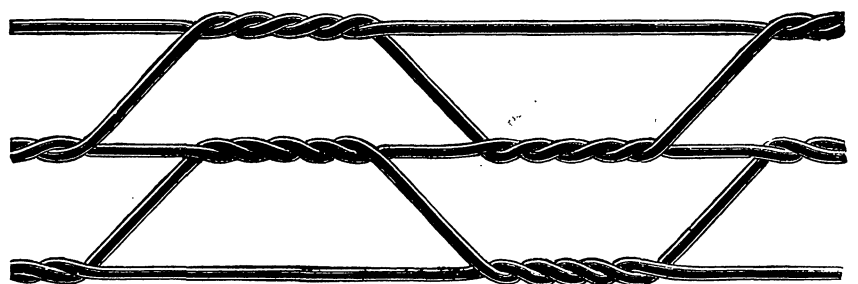
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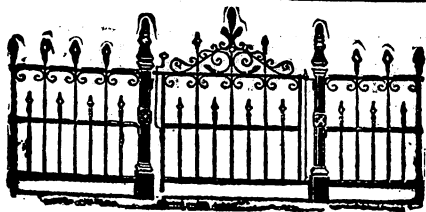
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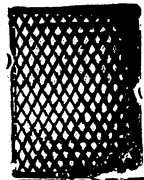


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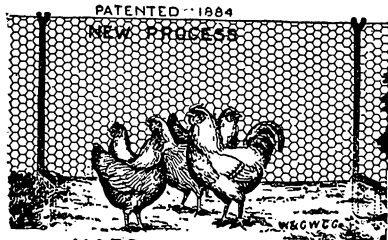
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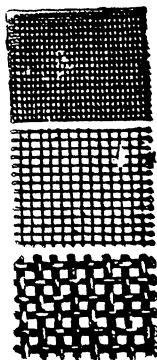
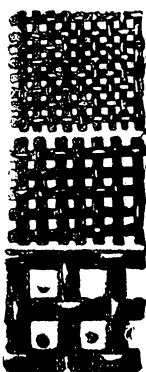
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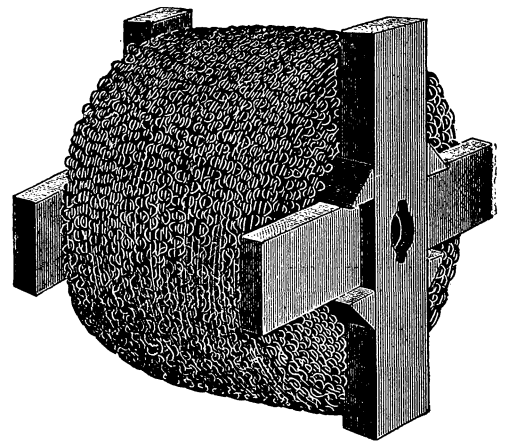
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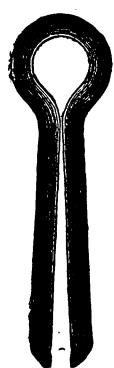
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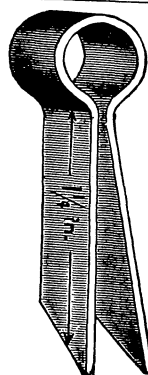


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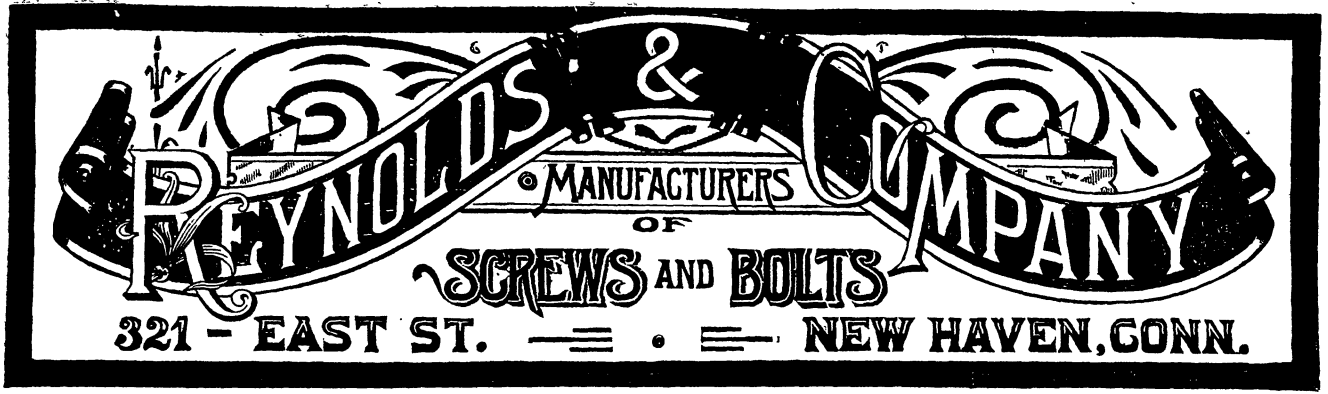
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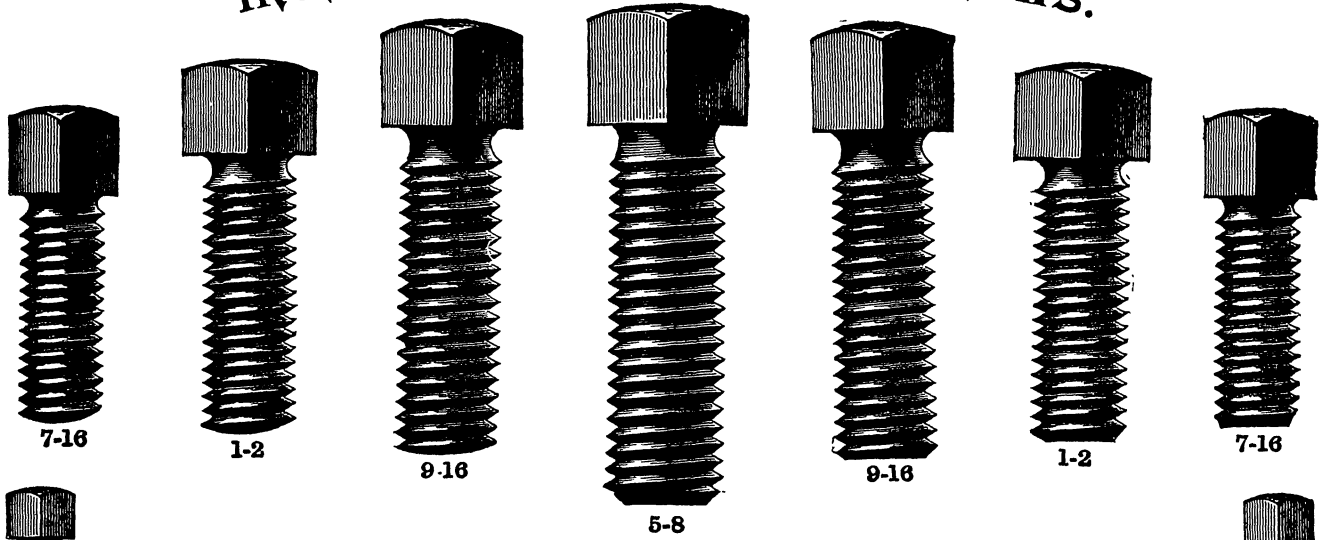
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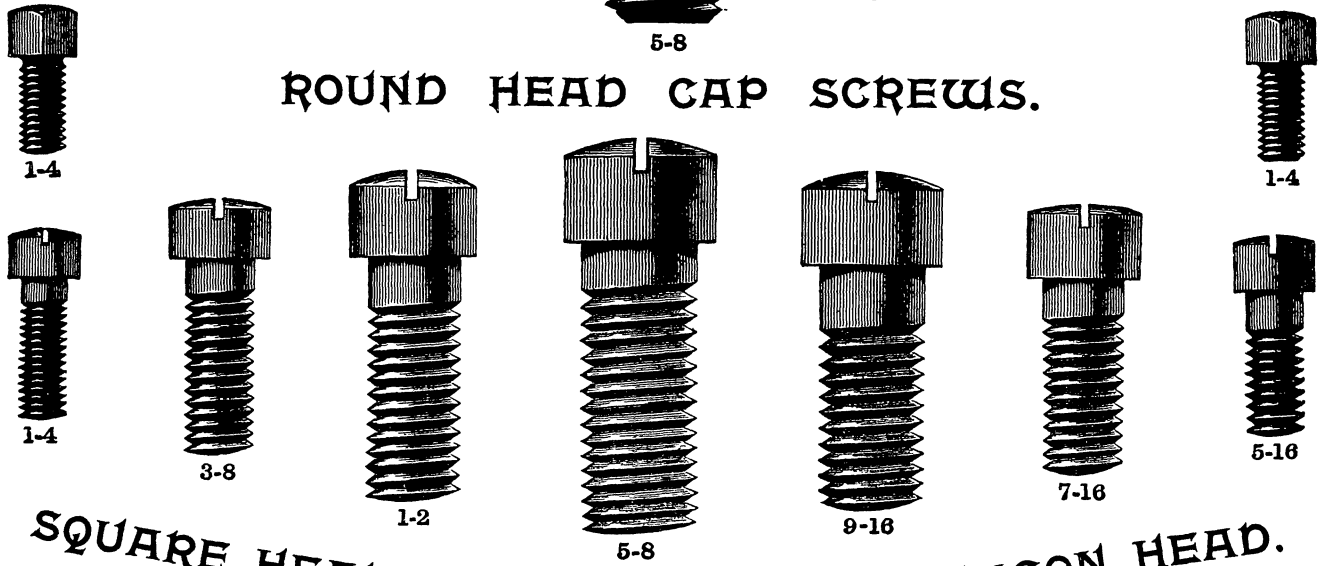
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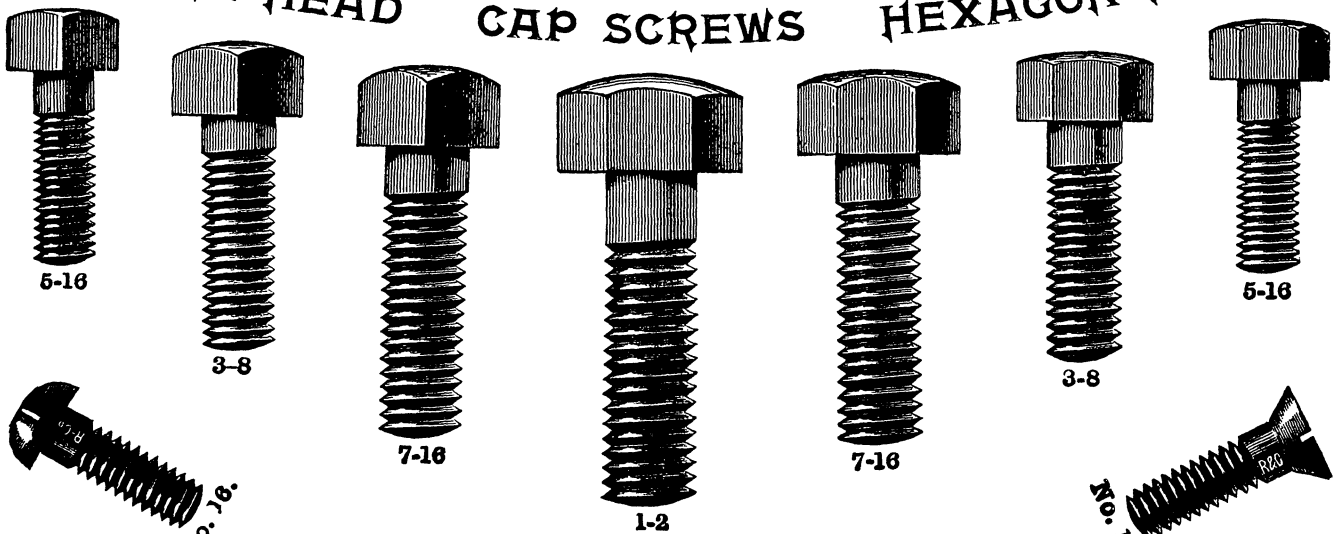
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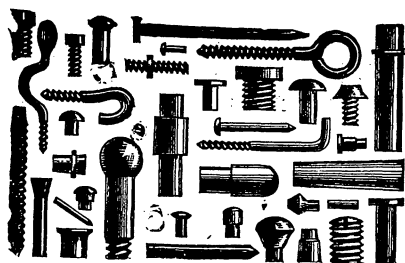
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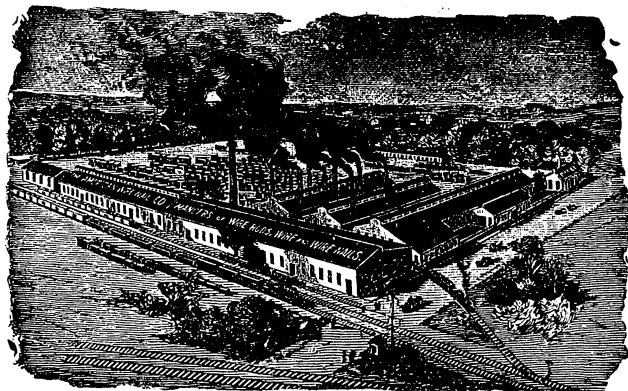
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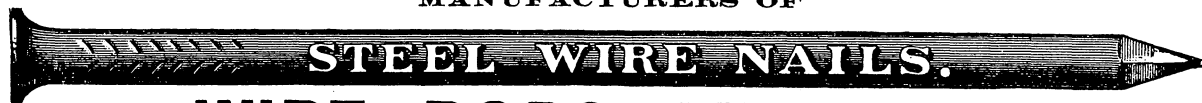
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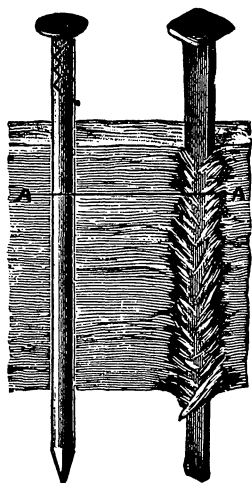
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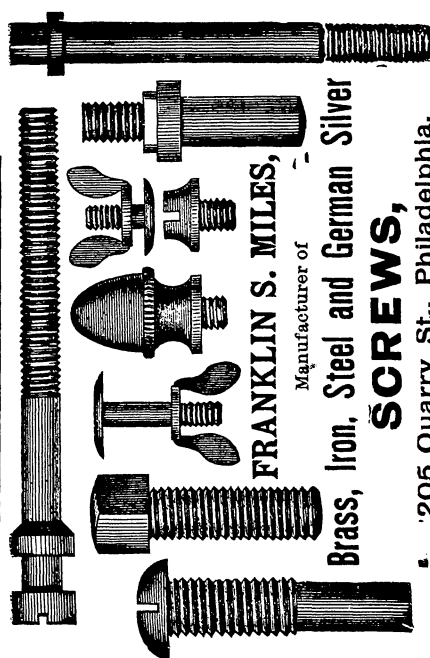
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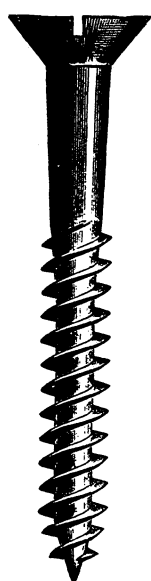
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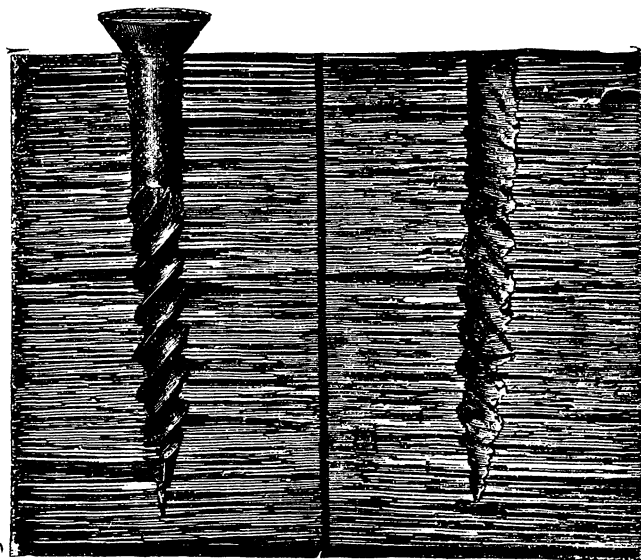
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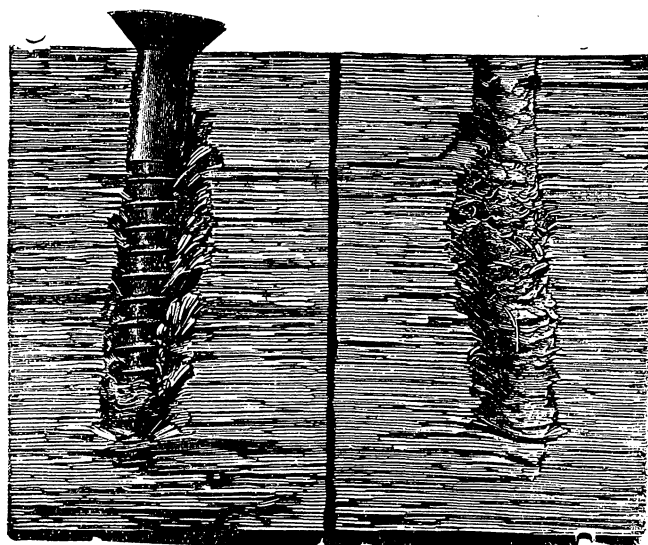
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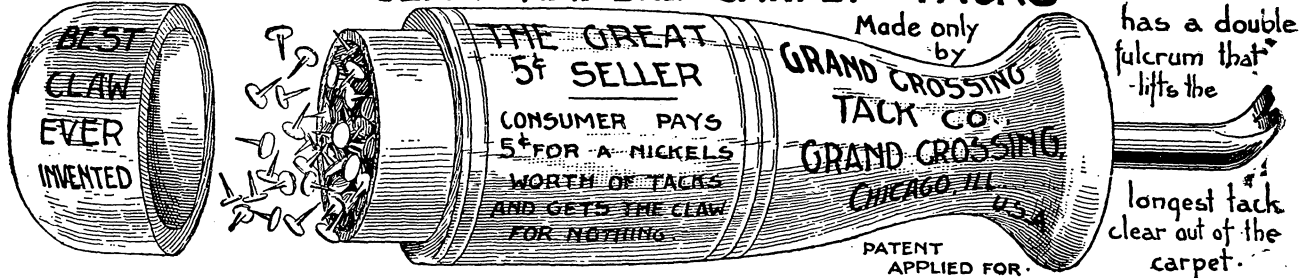
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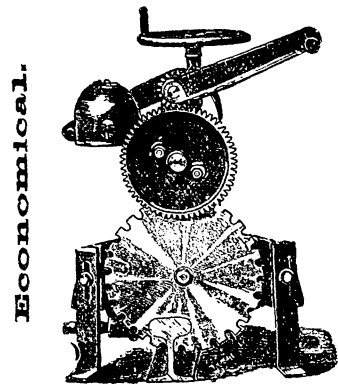
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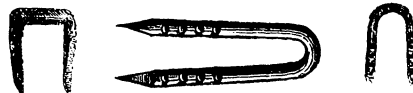
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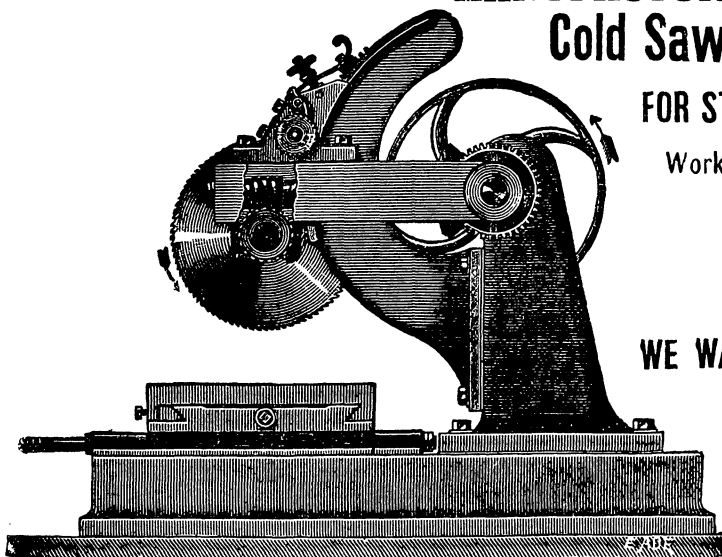
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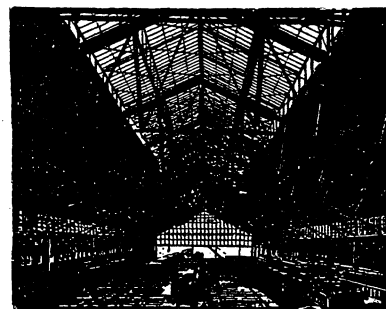
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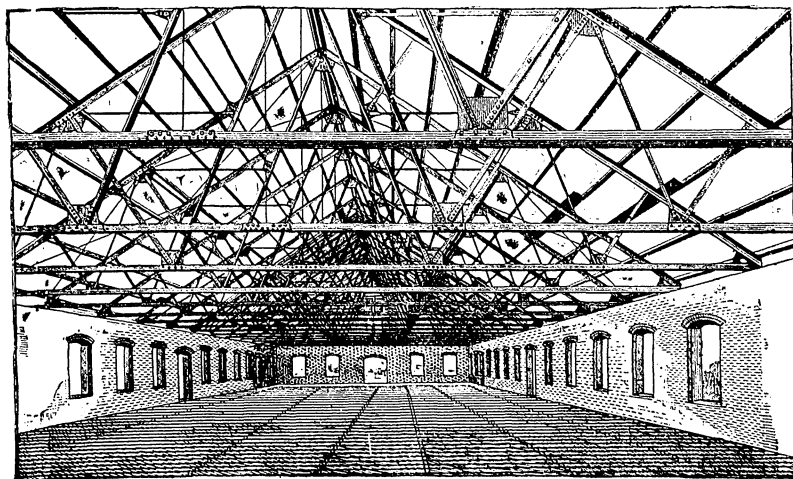
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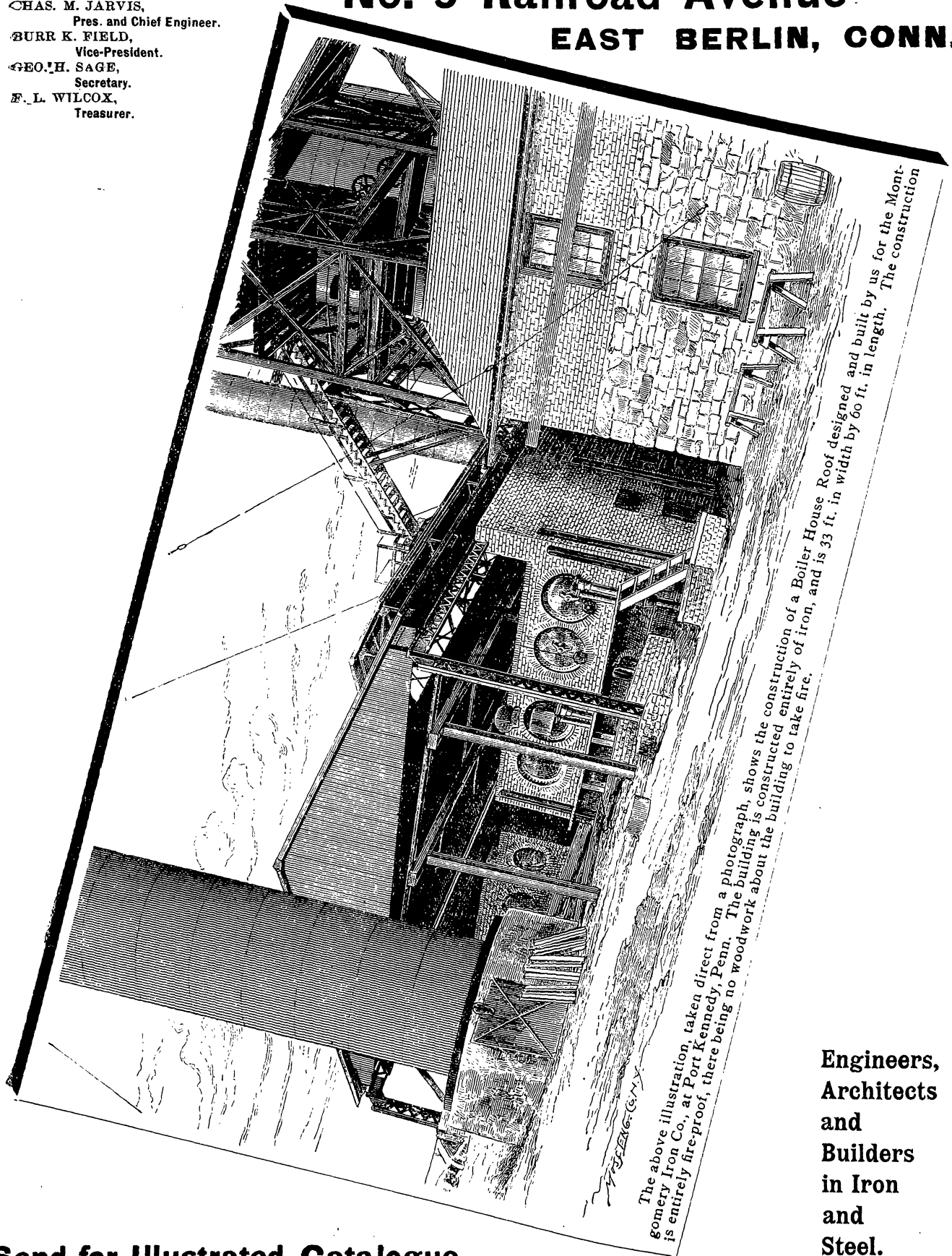
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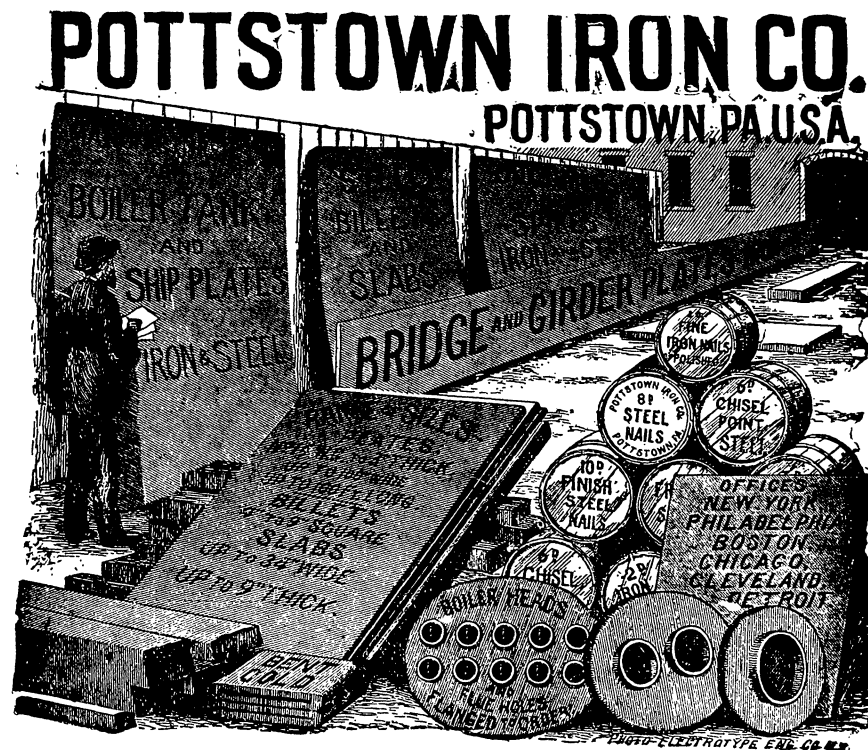
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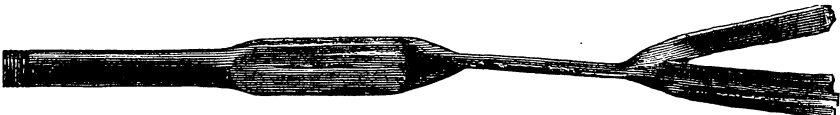
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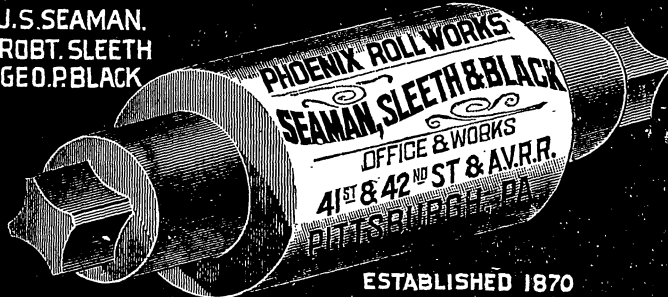
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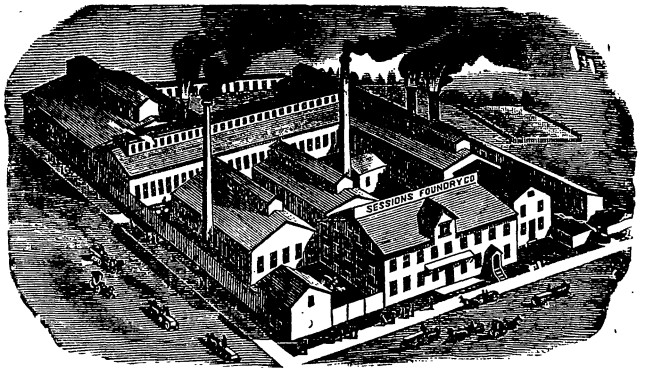
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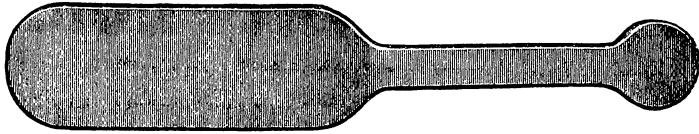
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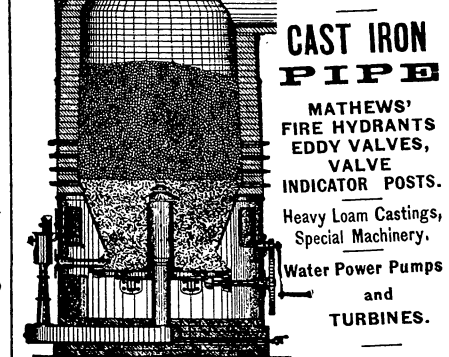
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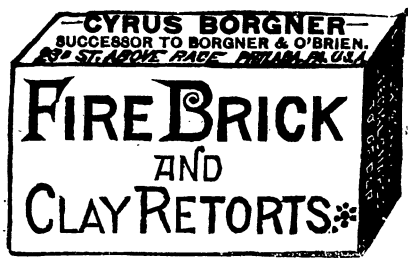
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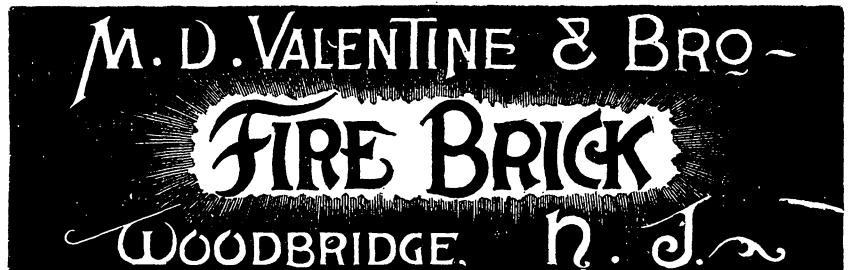
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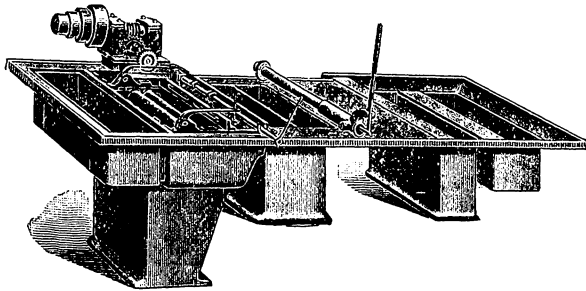
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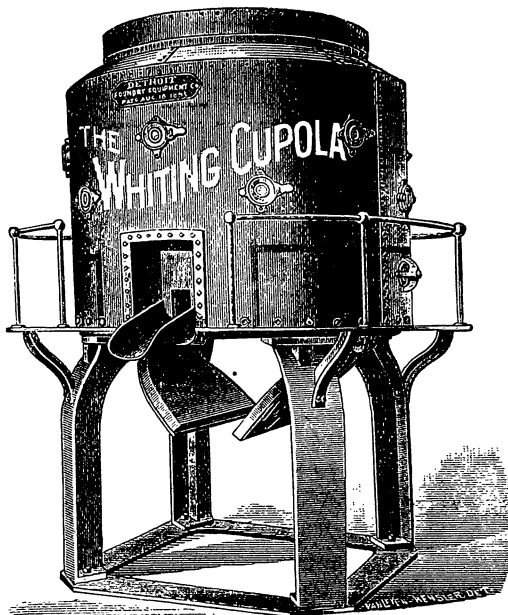
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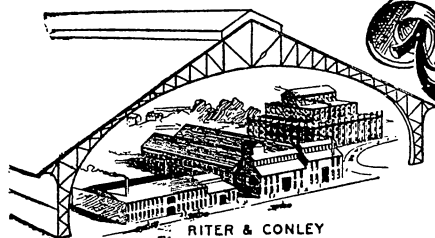
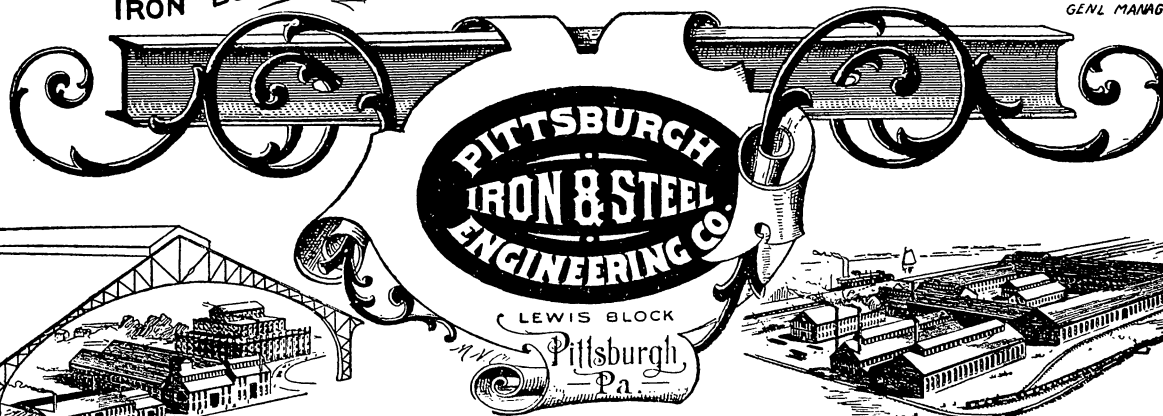
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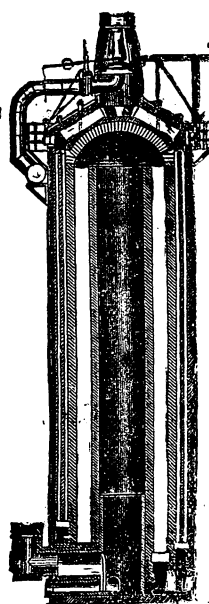
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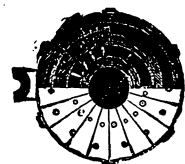
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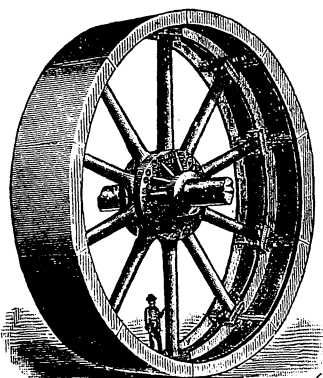
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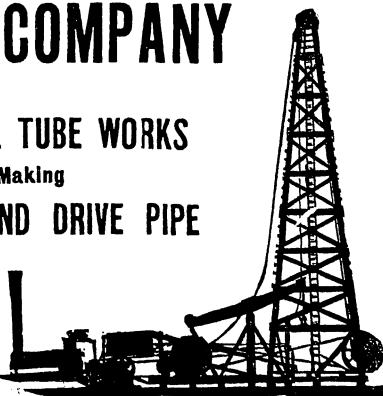
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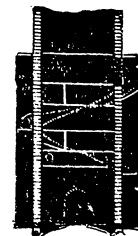
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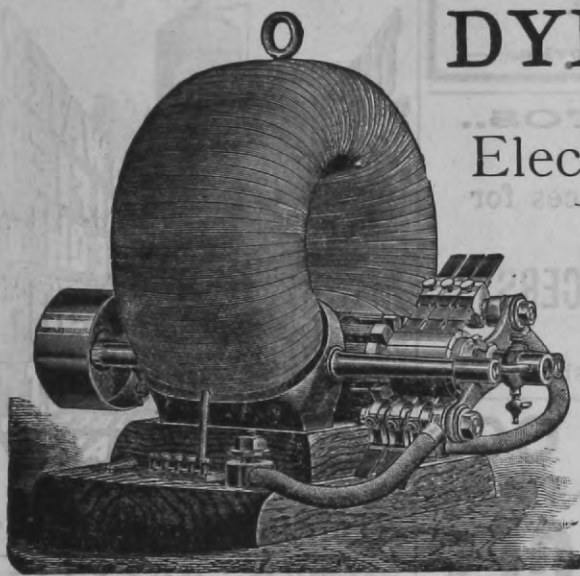
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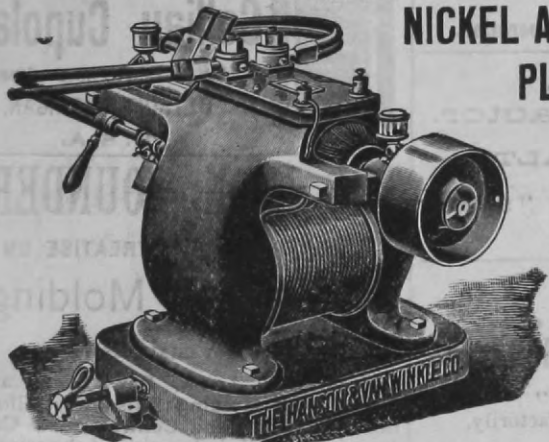
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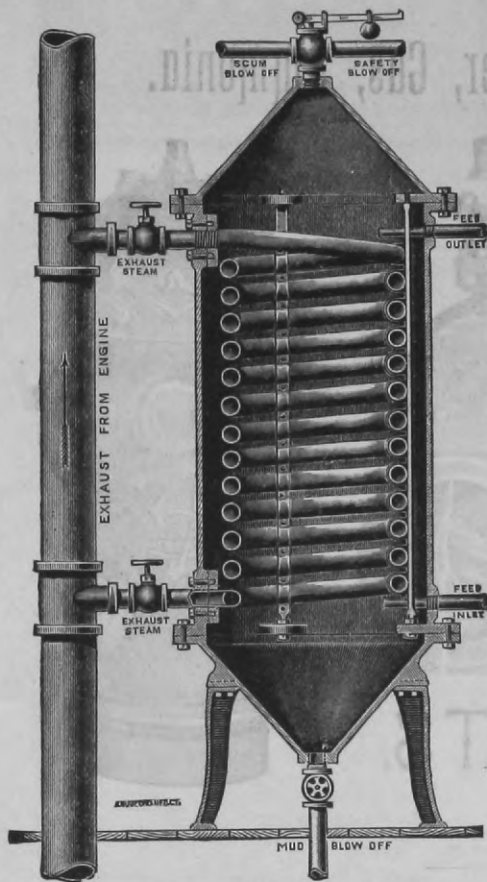
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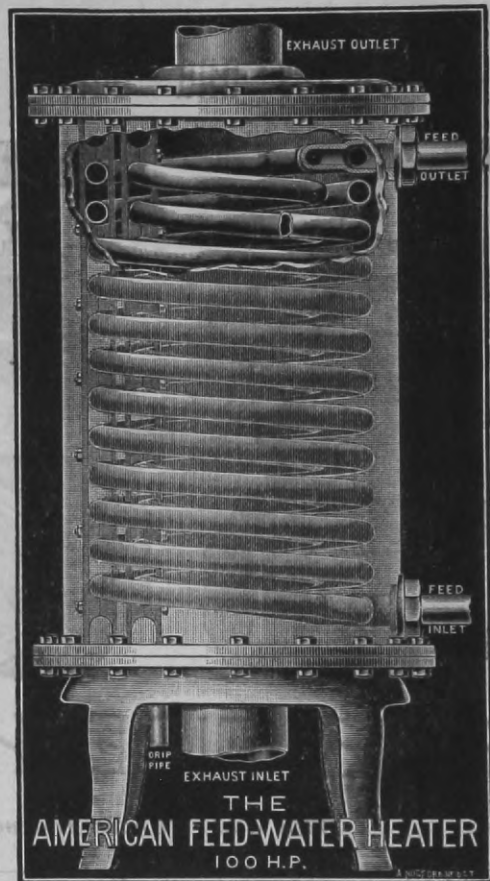
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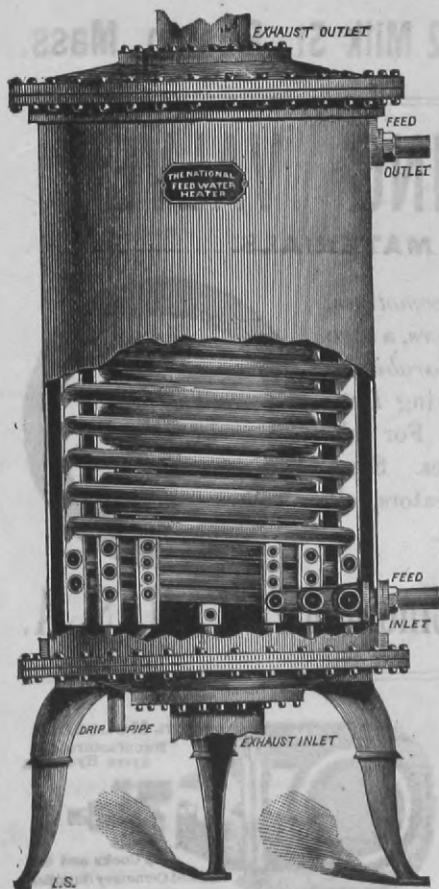
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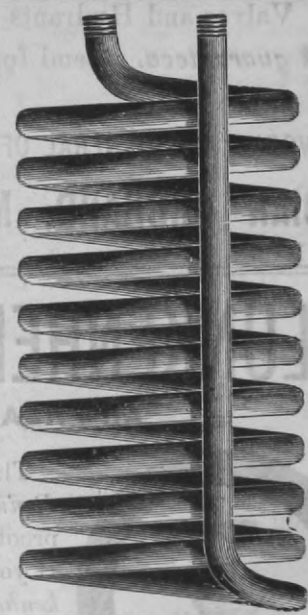
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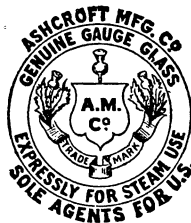
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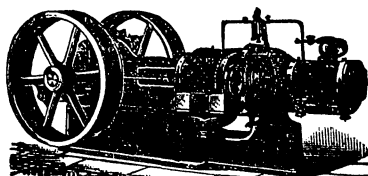
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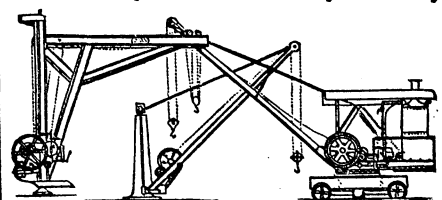
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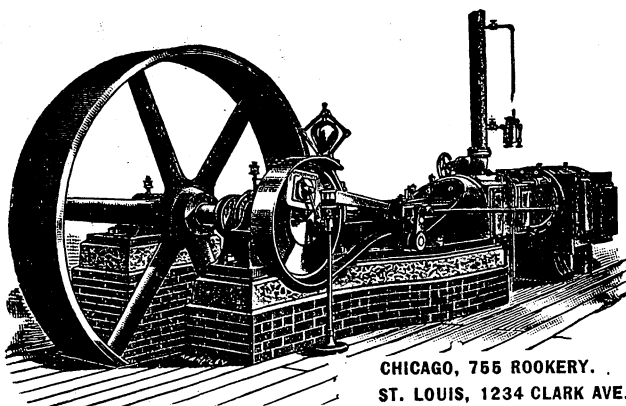
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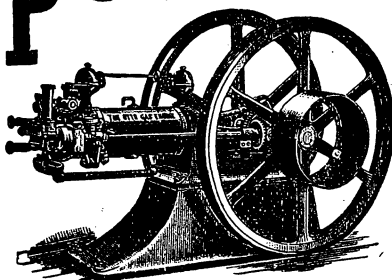
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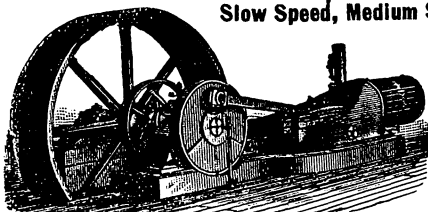
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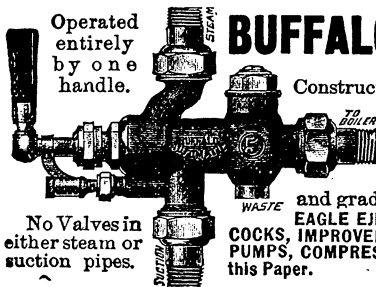


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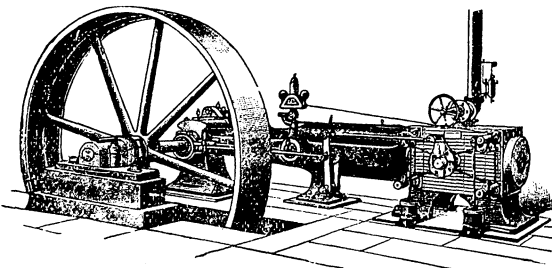
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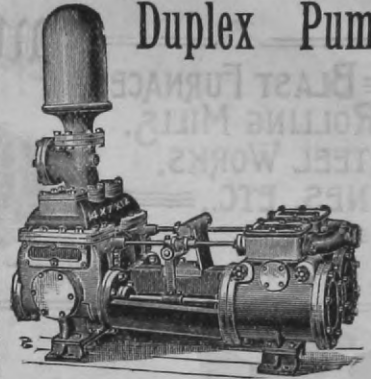
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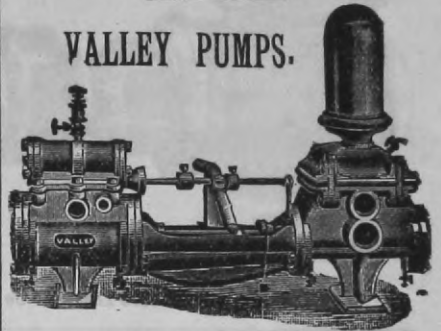
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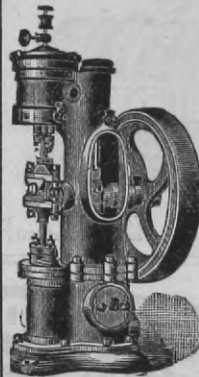
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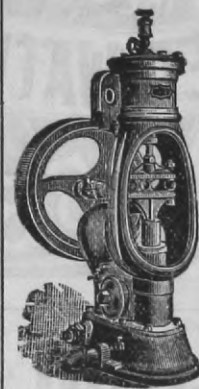
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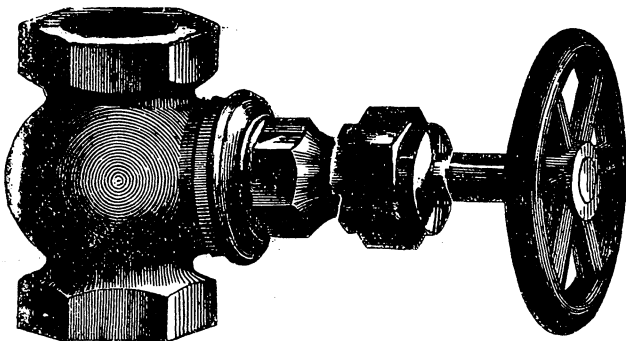
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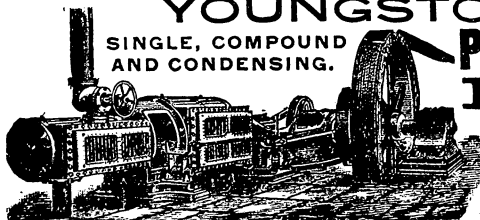
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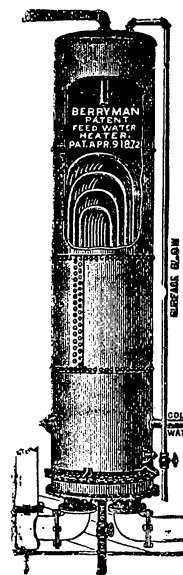
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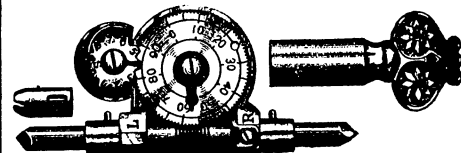
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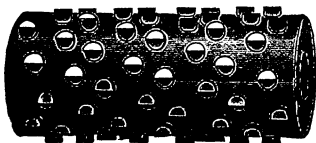


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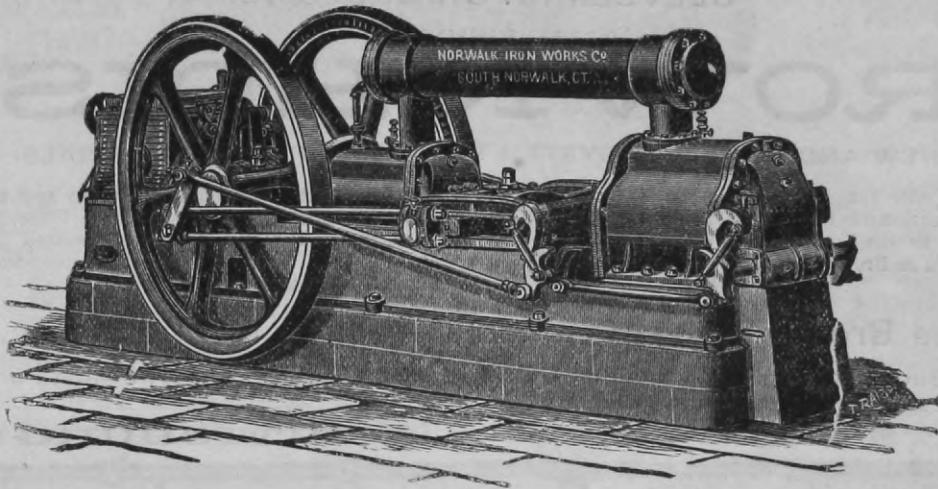
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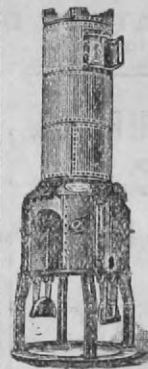
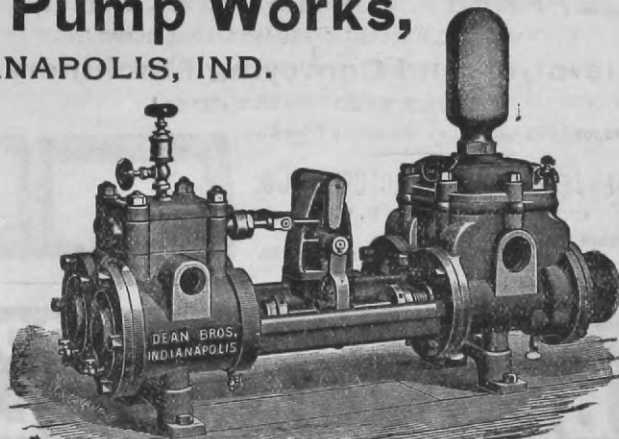
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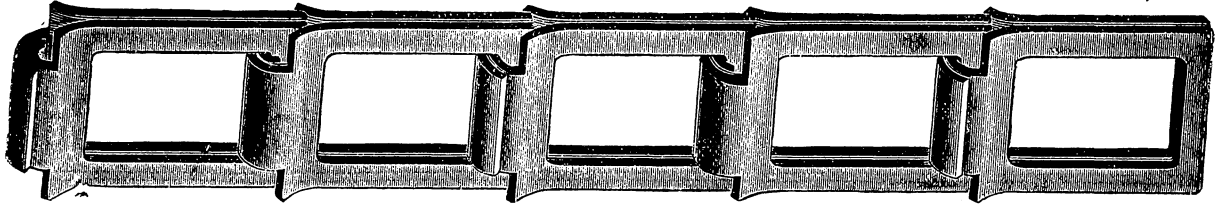
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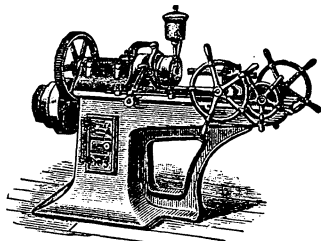
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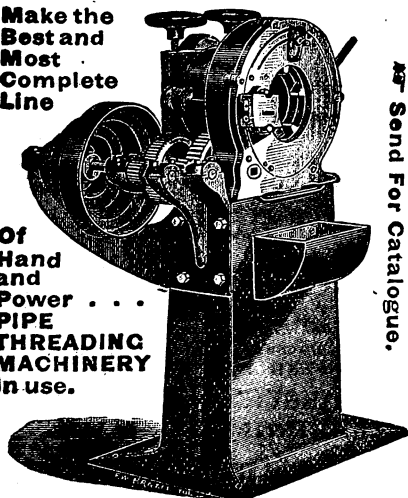
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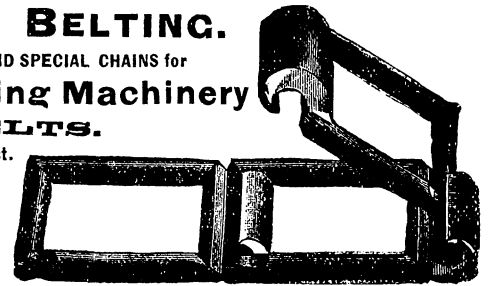
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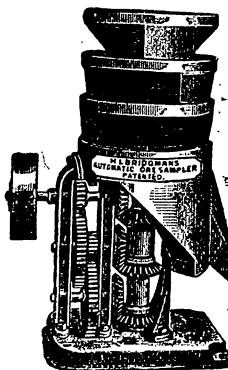
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Used by Smelting Works, Sampling Works, and Mills which are up to date.

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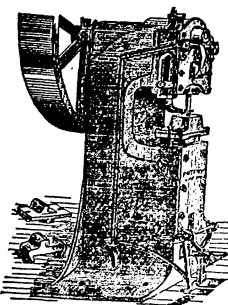
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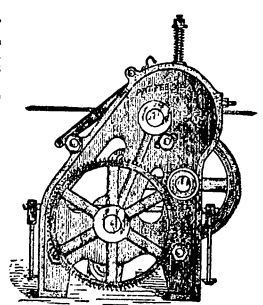
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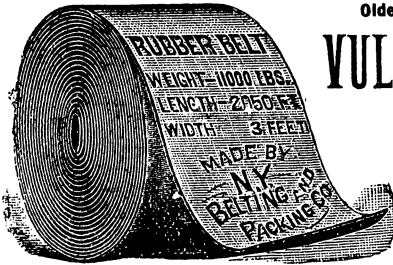
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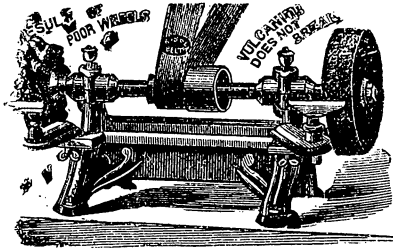
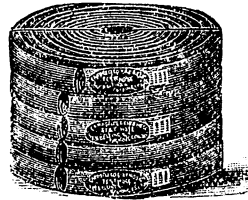
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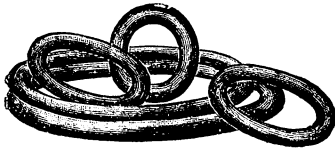
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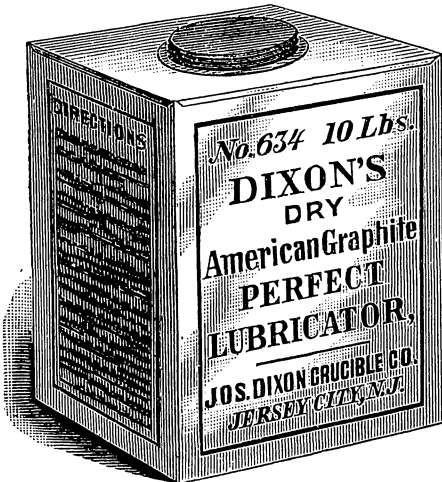
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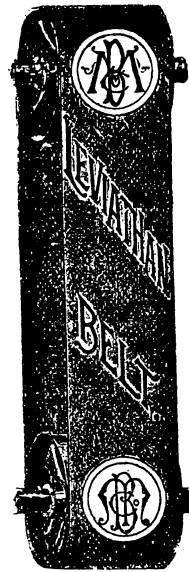
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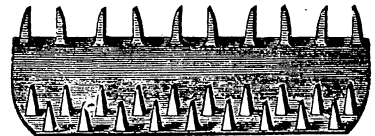
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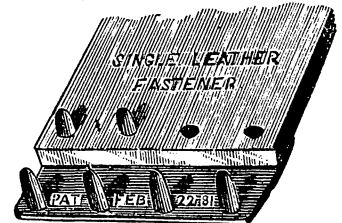
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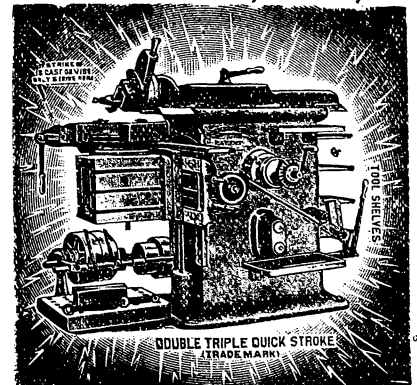
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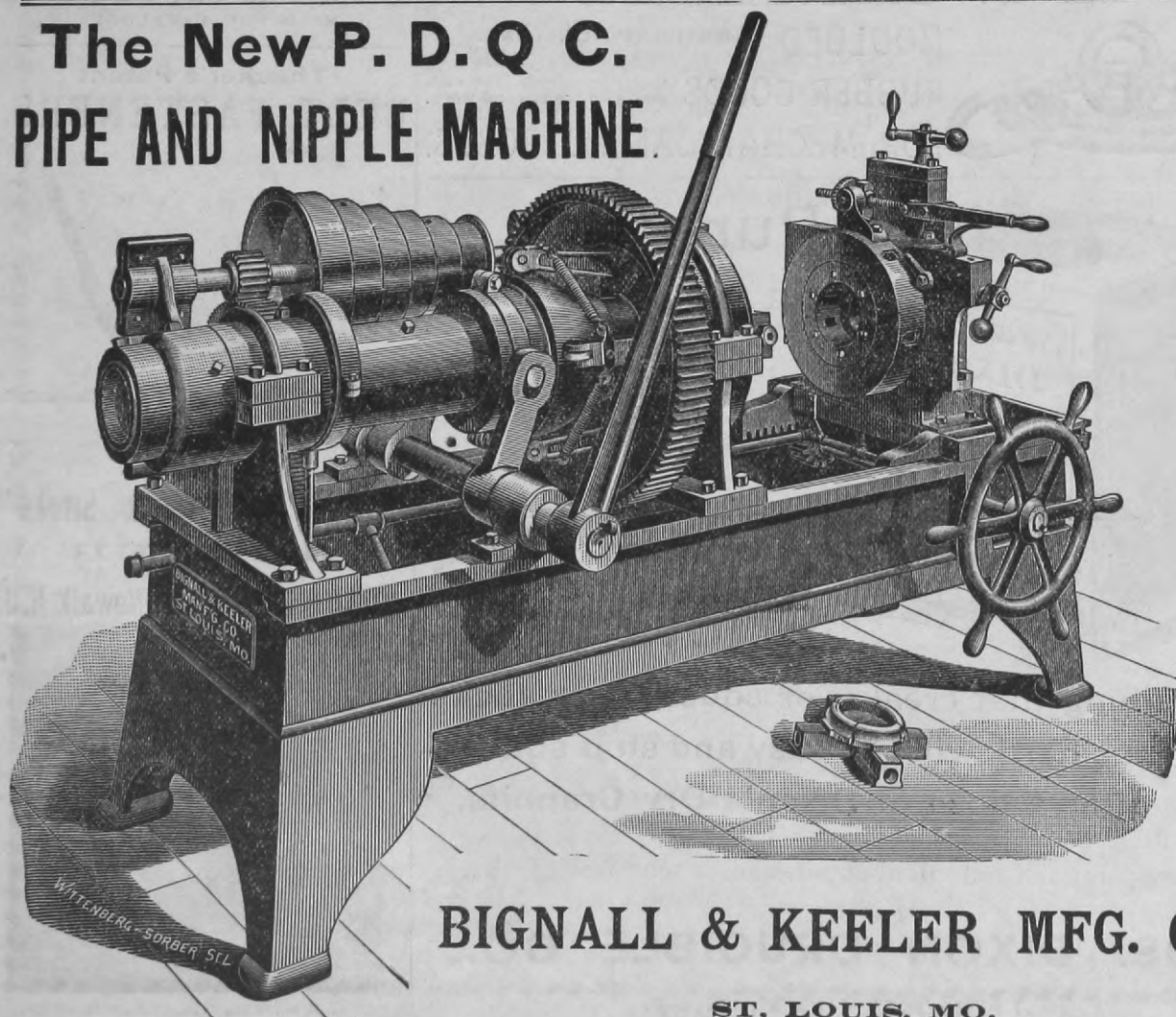
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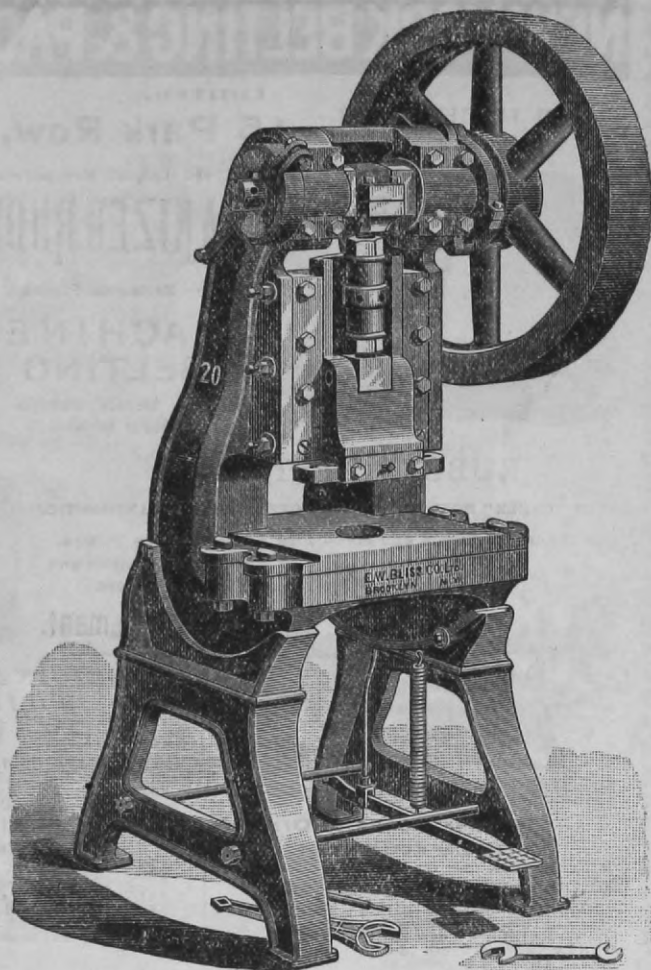
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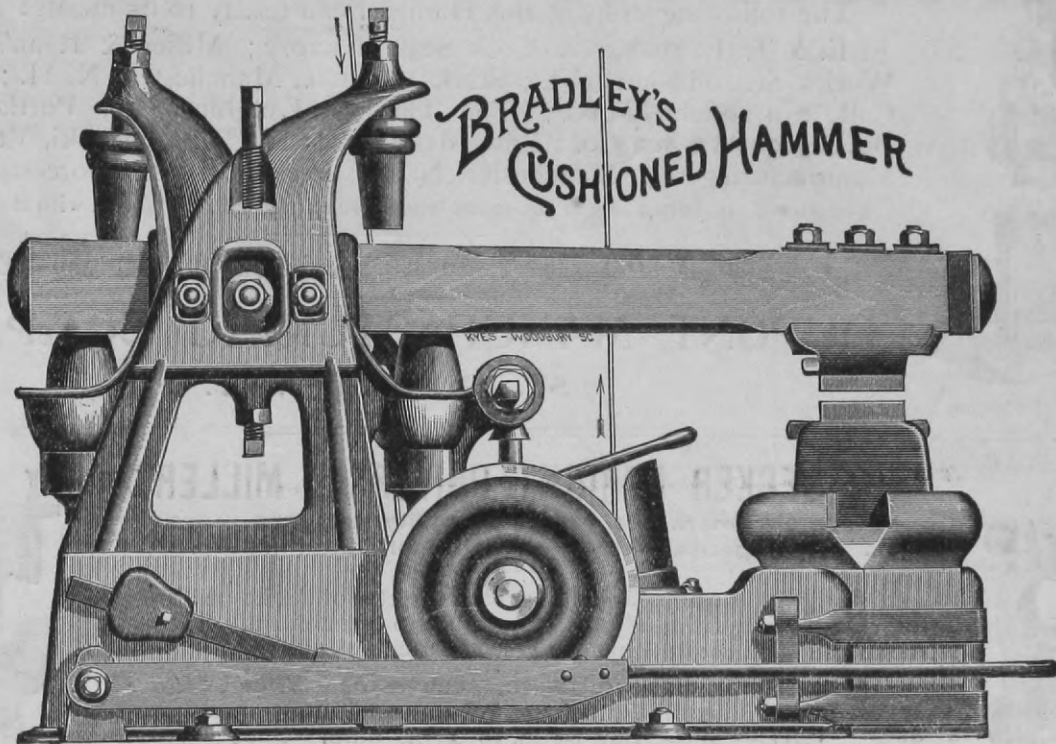
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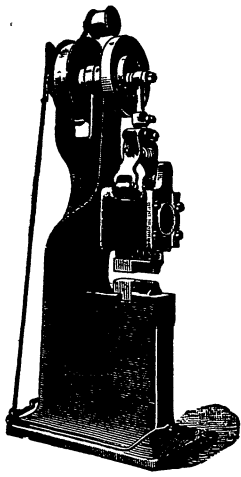
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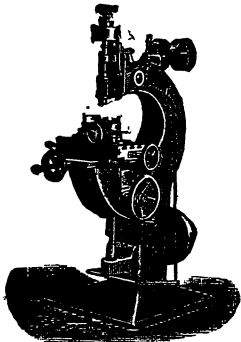
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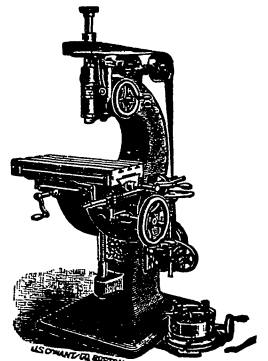
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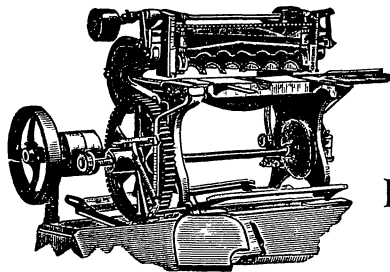
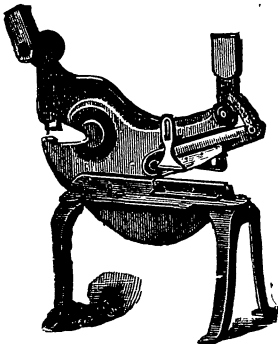
Fitchburg, Mass.



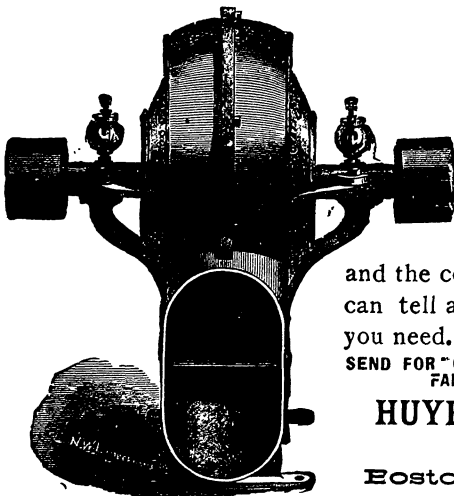
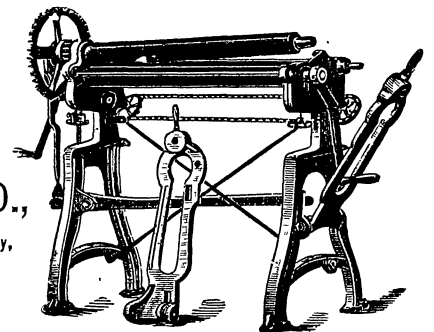
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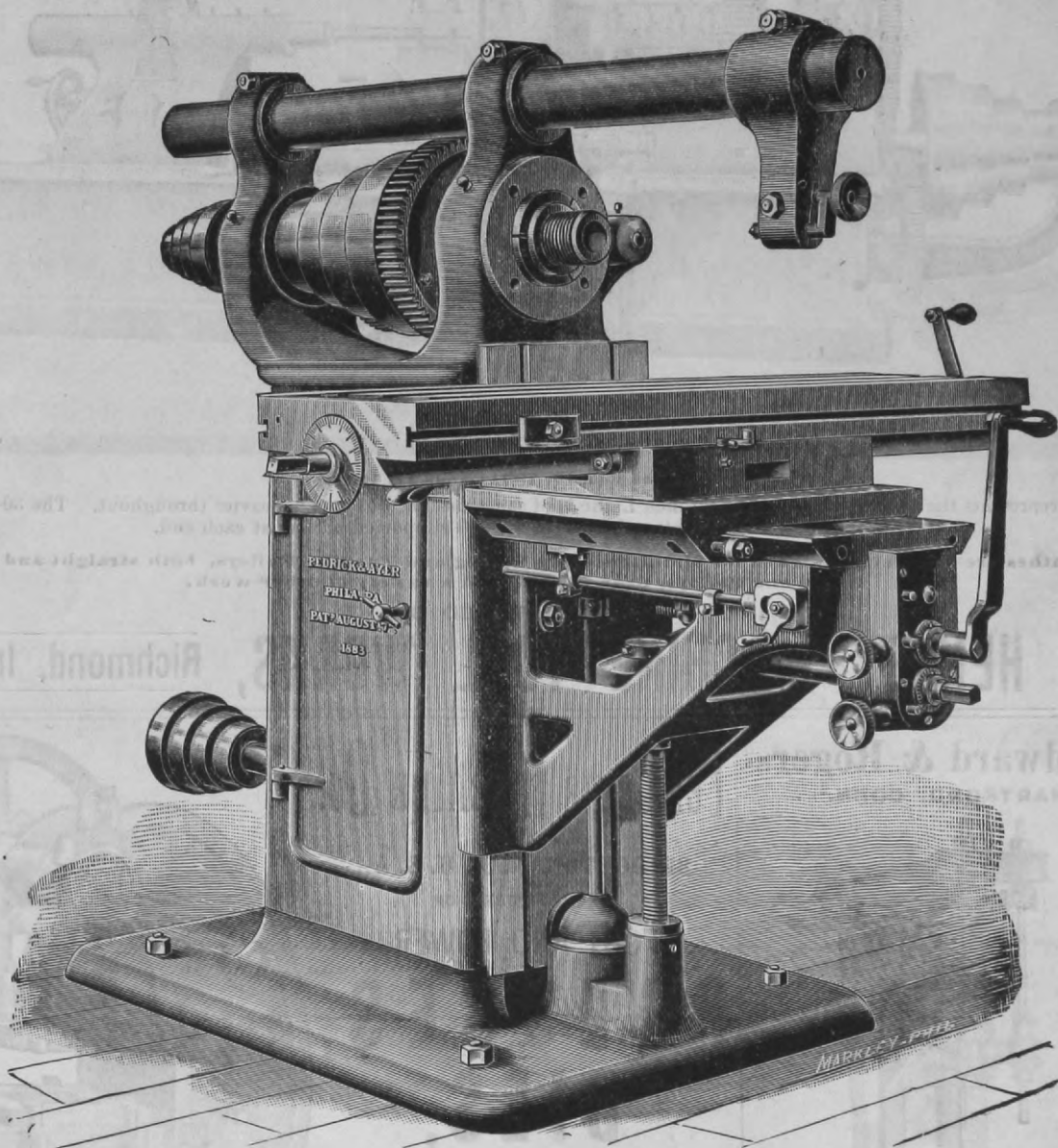
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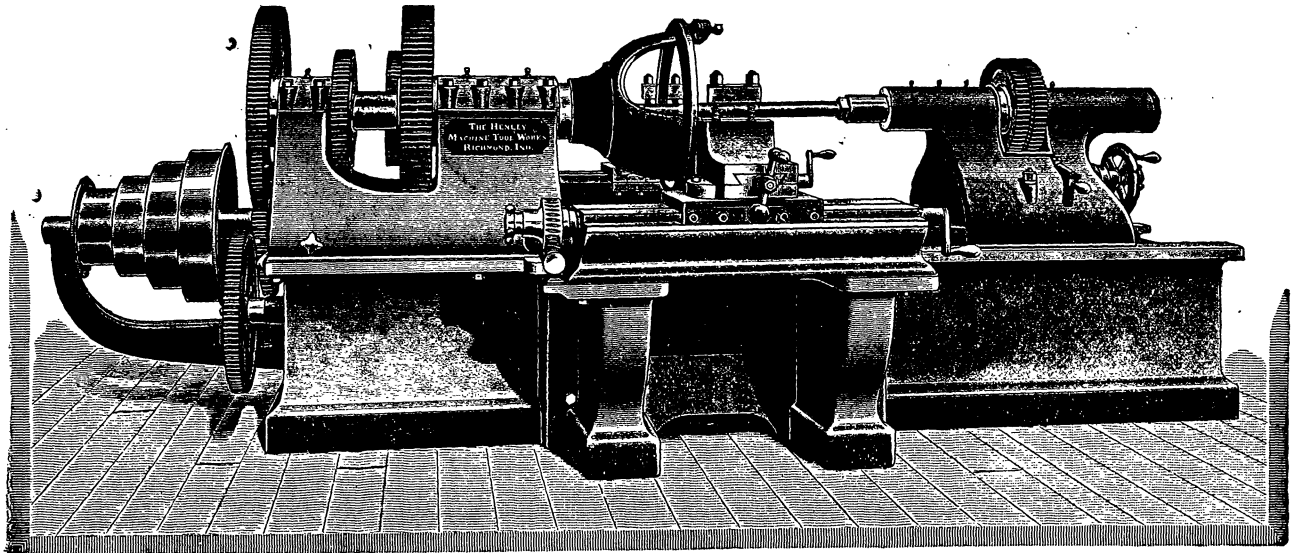
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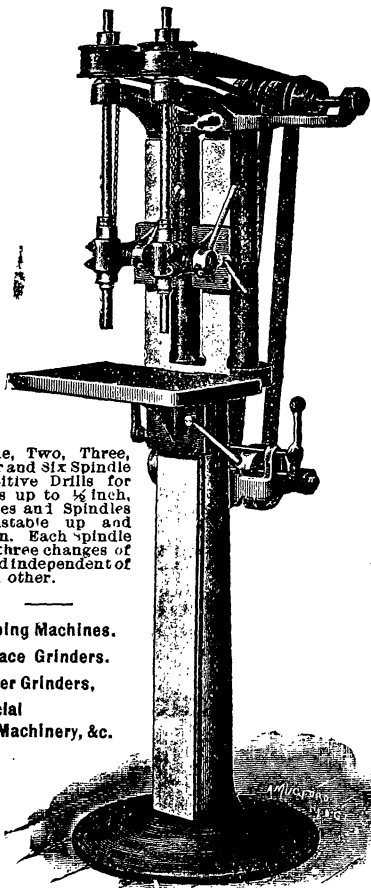
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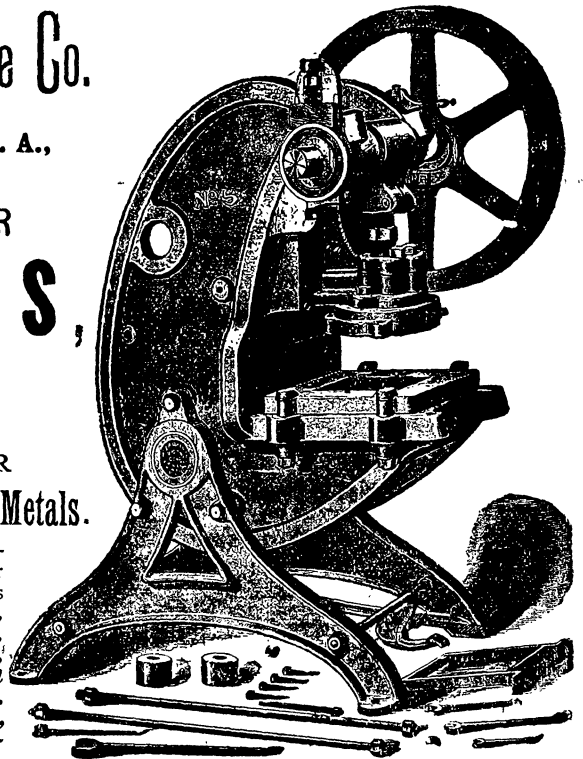
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PRESSES, DIES,

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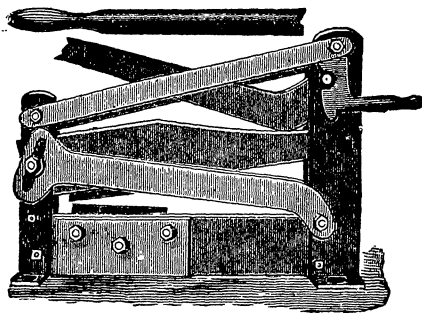
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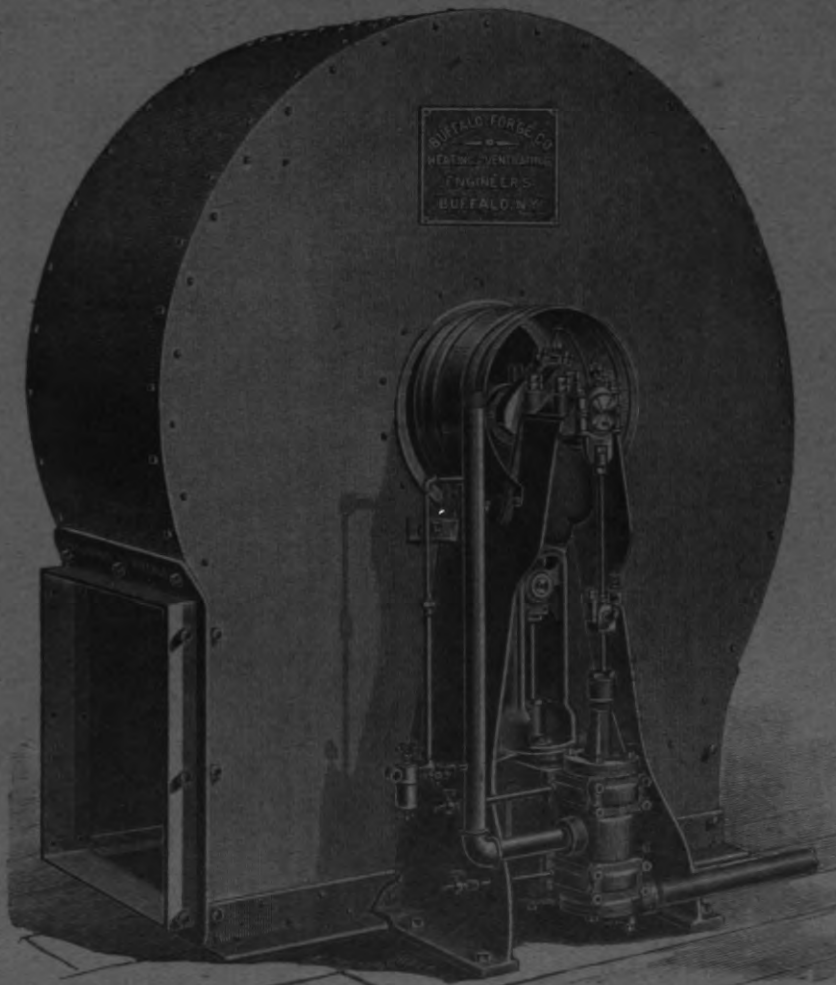
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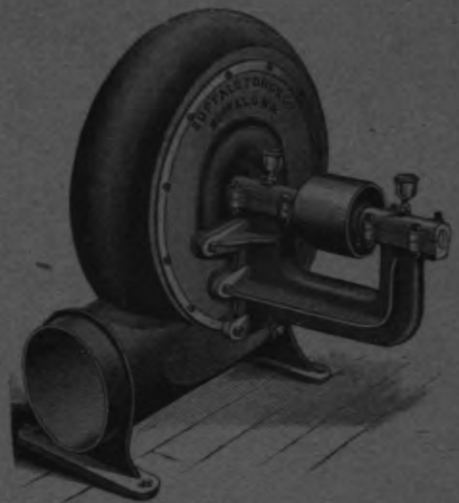
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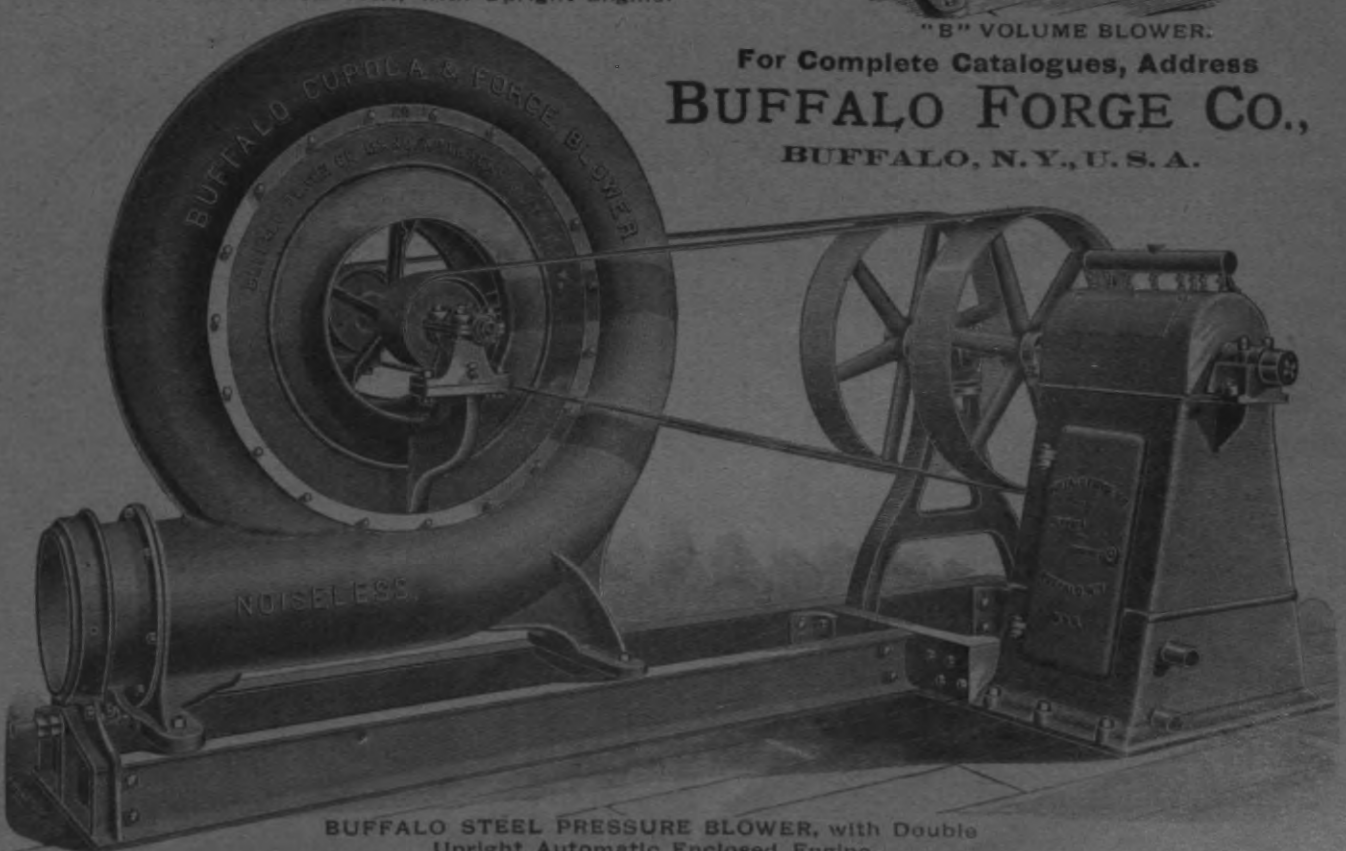


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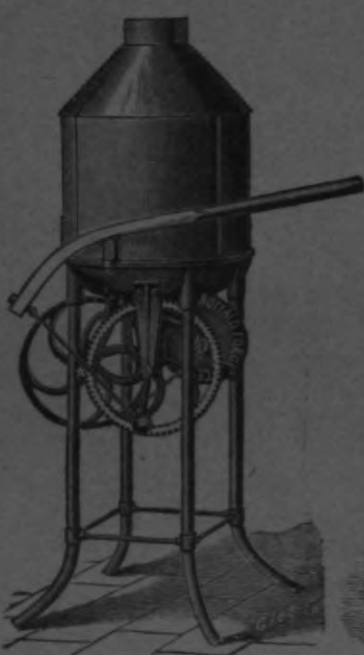
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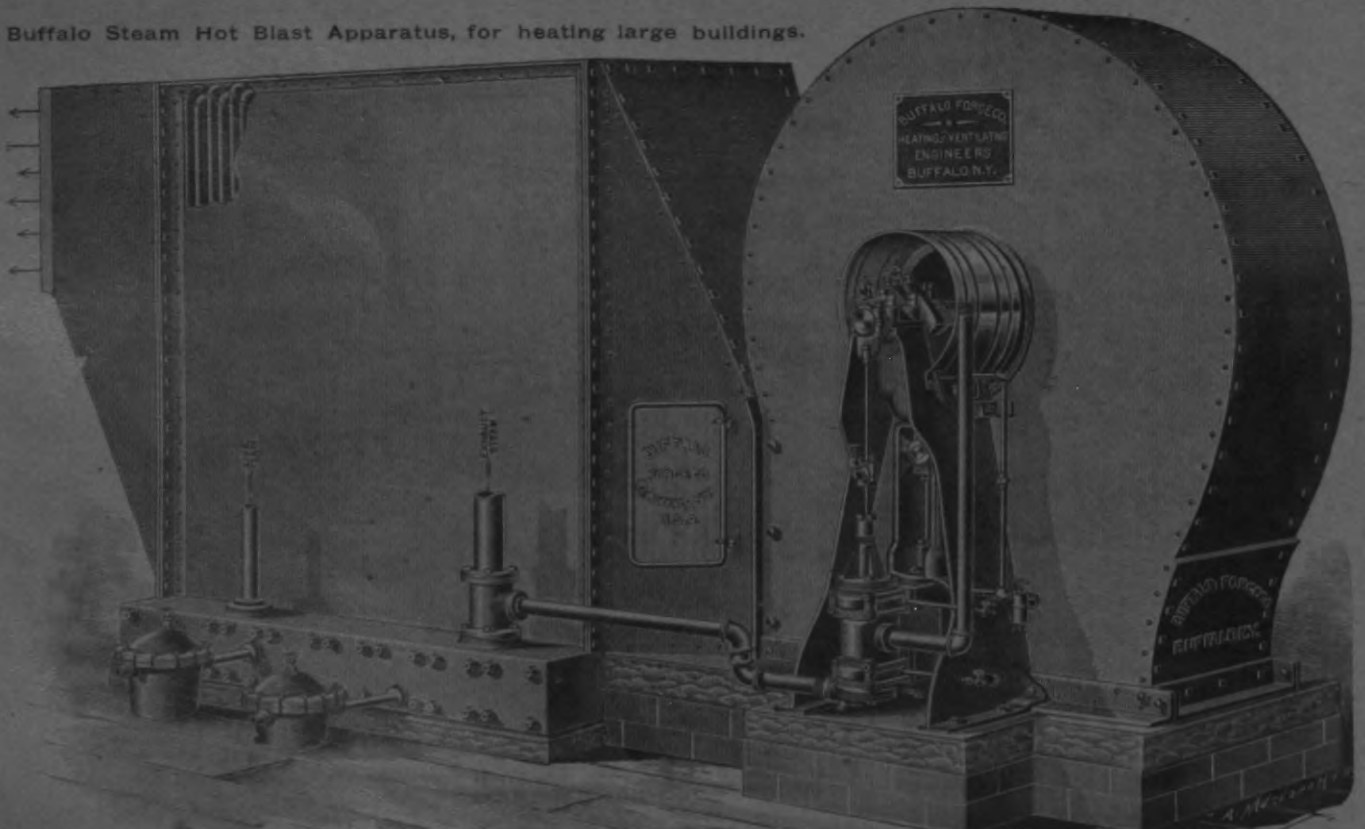


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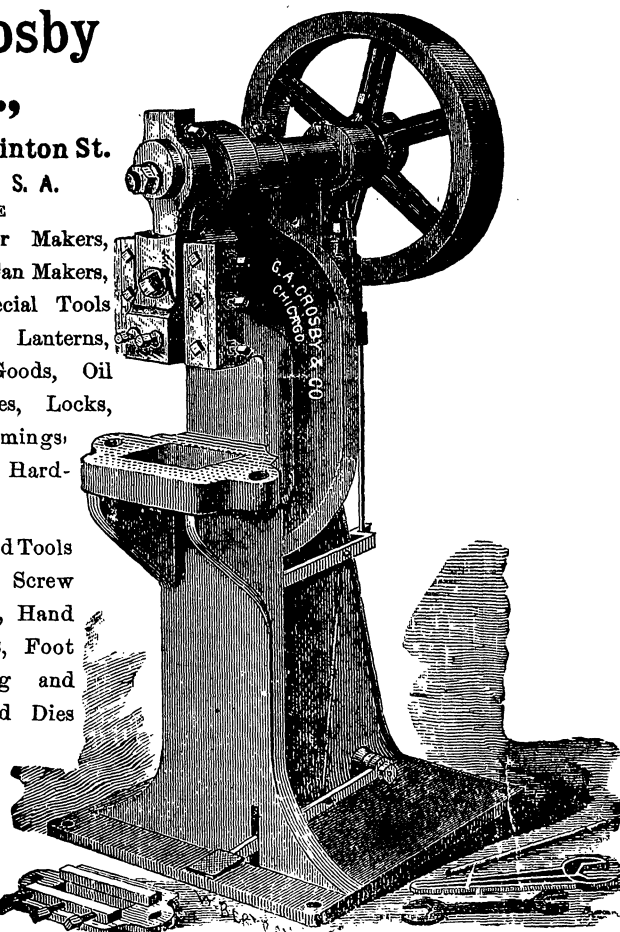
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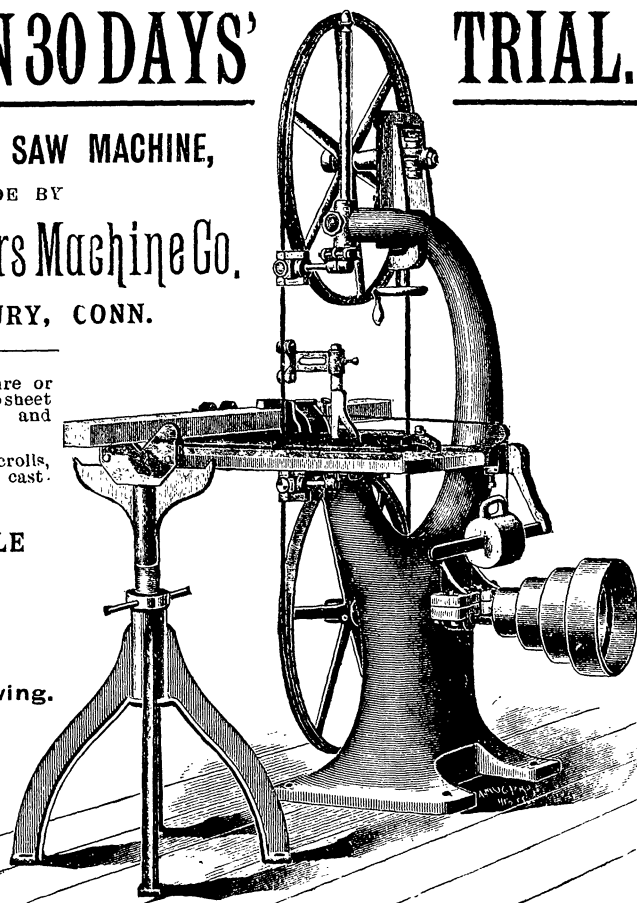
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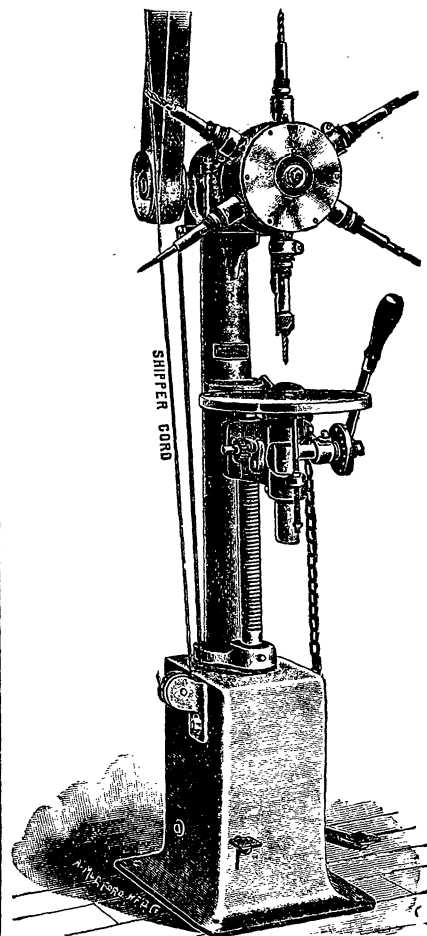
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Drills from 0 to 1/4 inch.

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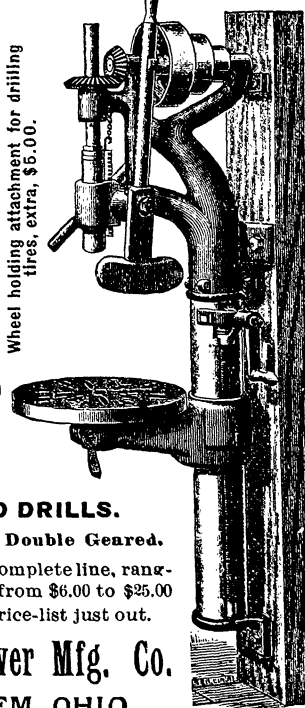
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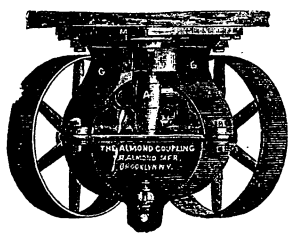
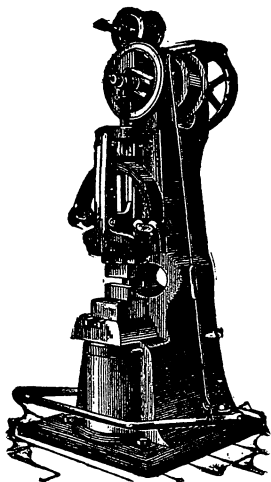
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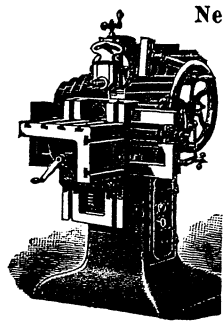


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It is a noiseless quarter-turn countershaft, self-contained, perfectly lubricated, and gives no trouble.
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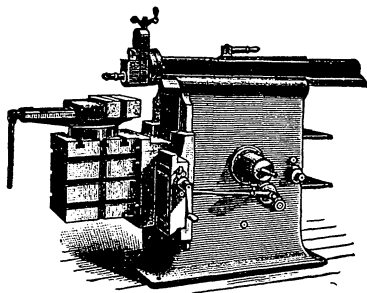
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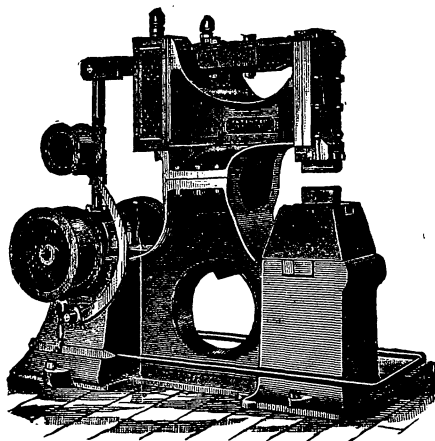
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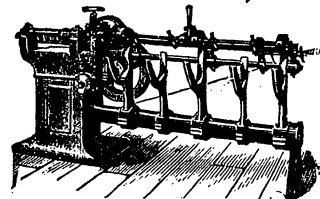
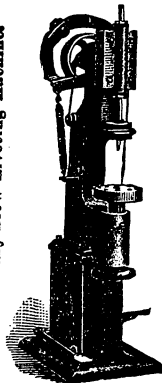
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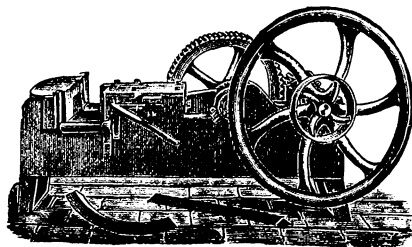
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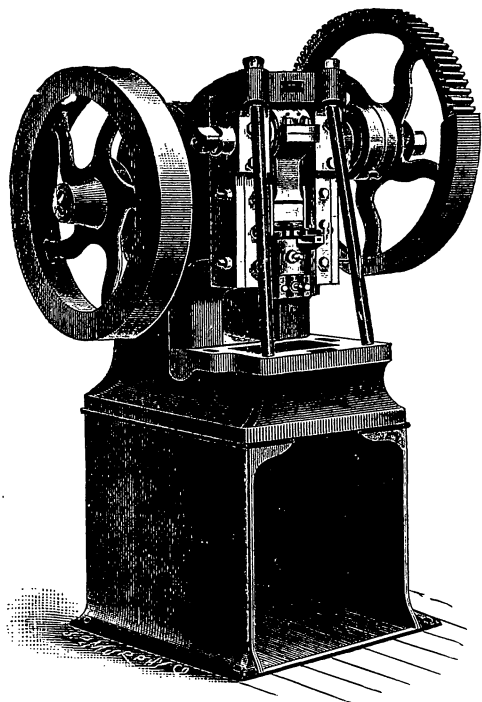
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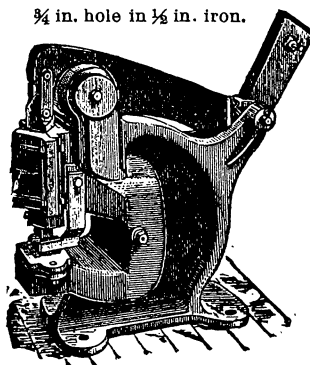
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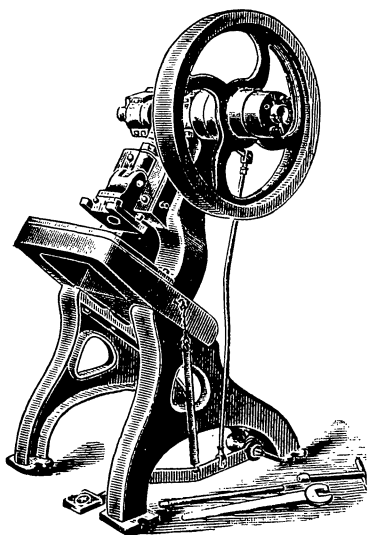
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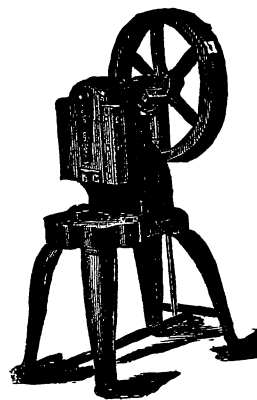
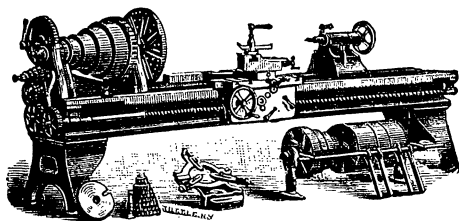
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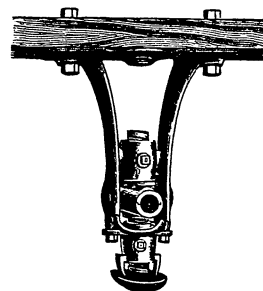
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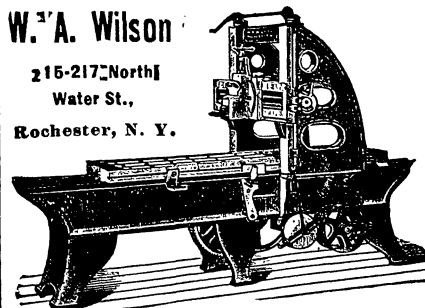


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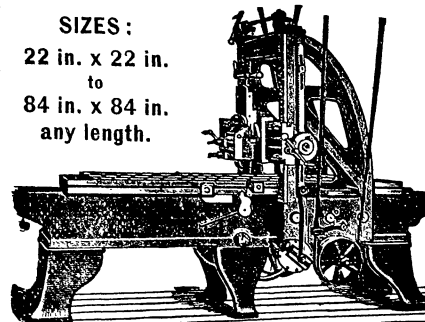
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to

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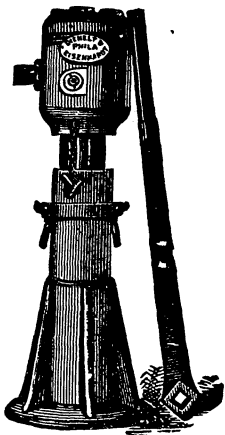
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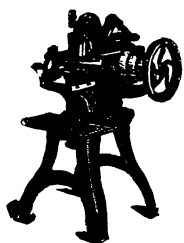
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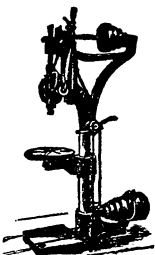
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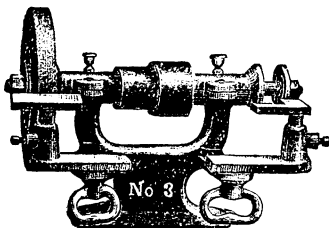


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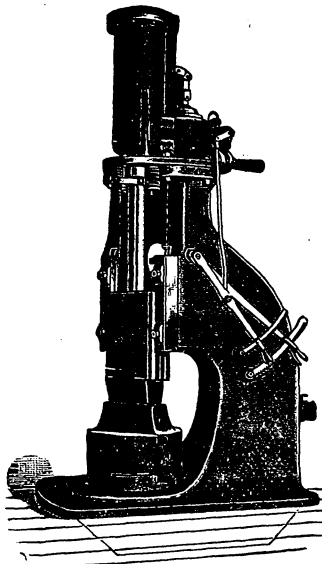
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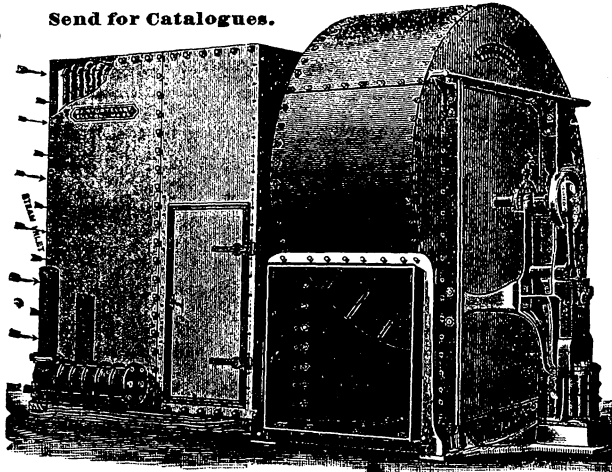
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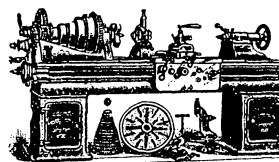
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MANUFACTURERS OF THE CELEBRATED

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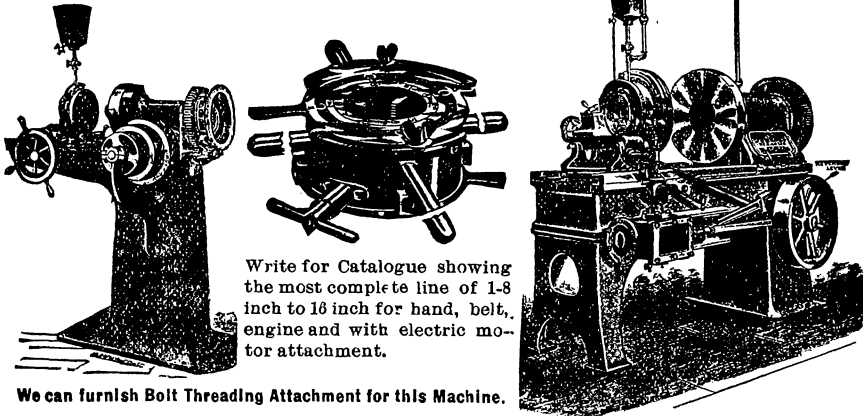
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POSITIVELY WILL NOT SPLIT.
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ESPECIALLY ADAPTED TO HIGH SPEED MACHINERY. NOISELESS
MORE DURABLE THAN METAL. NO LUBRICANT REQUIRED.
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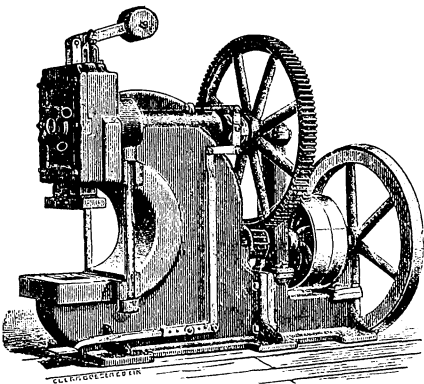


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We can furnish Bolt Threading Attachment for this Machine.

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DROP FORGINGS, BLAST FORGES.
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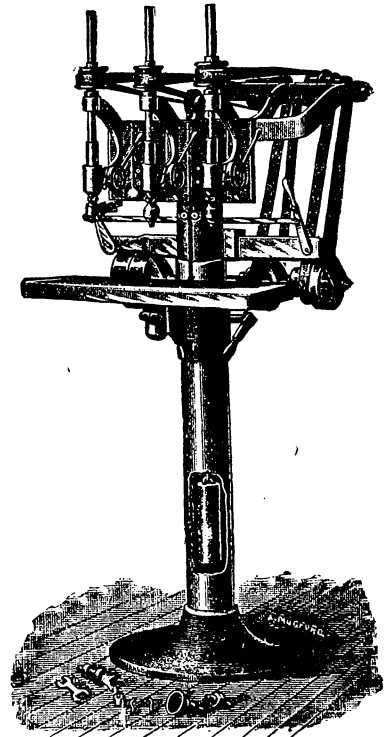


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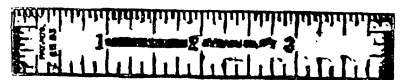
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Counter-balanced Spindles and Tables. Vertical range of table, 30 inches, and it will swing to right or left.

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NEW 13-IN. SENSITIVE DRILL.

Among the features of this drill is the counter shaft, independent of and belting to the base of the drill, thereby removing all jar or shaking caused by unevenness in the belt. This system of belting imparts a perfectly steady motion to the spindle, and the belts being long, give great power while running quite loose. The tension of the belt is never on the spindle. The table can be brought to an exact position by the screw shown in cut and is free to swing either way. A bell and V centre are provided with each machine for center drilling and reaming. Either round or square table can be furnished.

Every Drill warranted.

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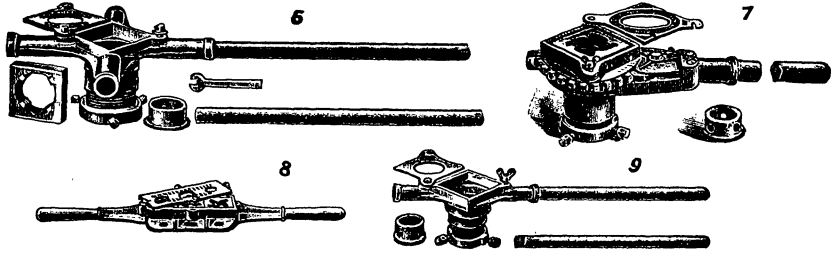
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Threading pipe 1/4 inch to 6 inch; the larger sizes have CUTTING-OFF attachment. These tools are light, strong and of superior design and finish; also PIPE threading MACHINES 1/4 inch to 16 inch hand or power. Send for catalogue to

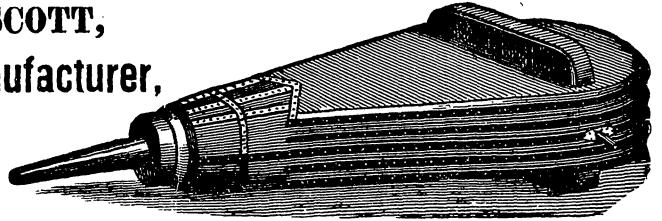
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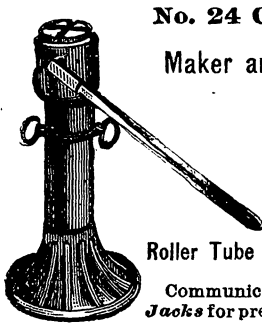
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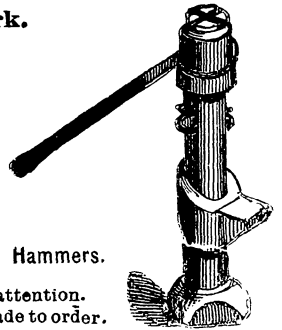
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Hydraulic Jacks
AND
Punches.



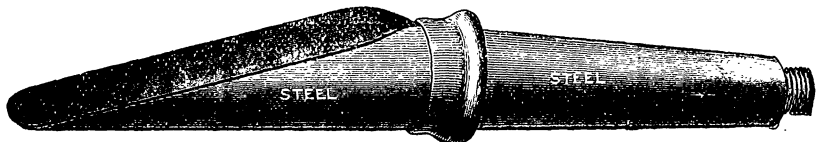
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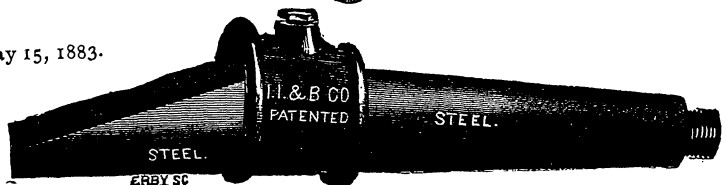
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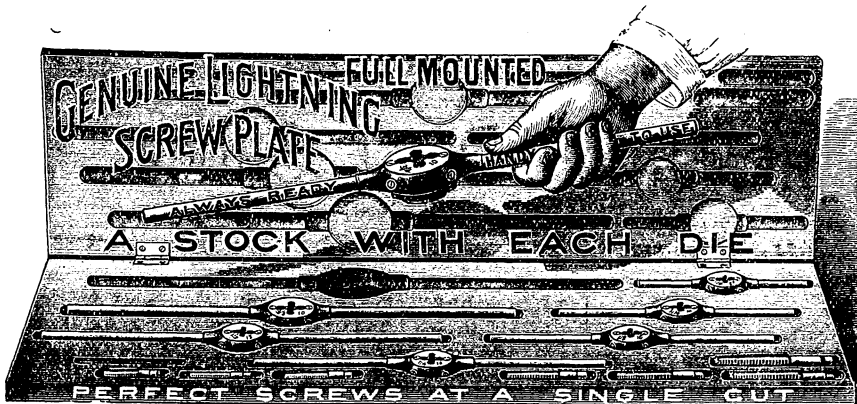
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Jack Screws, Tire Benders, Track Jacks,
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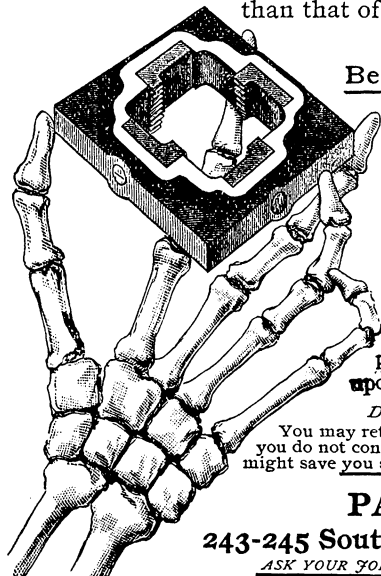


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Two "Points" about it—only 2 (There are plenty more, but we only mention these two here.)

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Before it becomes dull from use it will cut as many perfect threads as the best solid die extant, and when it is dull, you don't throw it away and buy a new one—Oh, no! You simply sharpen the cutters on a common grindstone, and so make it practically as good as it was at first, and this sharpening process may be repeated a number of times.

A sample One-inch "Skeleton" Pipe Die, either $2\frac{3}{4}$ or $2\frac{1}{2} \times \frac{3}{4}$ thick, by mail, postage prepaid, will cost you 62 cents, and will be sent upon receipt of a Postal note for that amount.

DO NOT SEND US ANY POSTAGE STAMPS.

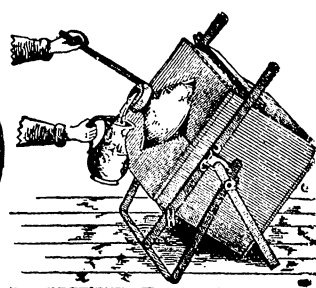
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ASK YOUR JOBBER WHAT HE KNOWS ABOUT THIS TOOL.

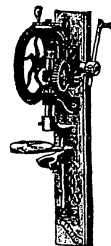
Wire Drawing Machines, **WATERBURY**
Gang Slitters,
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The No. 1 Champion Lever Blacksmith Forge.

Largest Blacksmith Forge in America.

Fan 16 inches in diameter with a five inch outlet, Hearth 32 by 45 inches. Provided with our Patent Sloped Bottom Coal Box, which holds one-half bushel. This Slope Bottom Coal Box, in connection with the enormous size of Fan and Hearth, makes this Forge the greatest tool in America for the Blacksmith for quick and easy work.



The World's Champion \$10.00 New Upright Self-Feed 1891 Pattern Post Drill.

Weight, 120 Pounds.

Drills from 0 to $\frac{1}{4}$ inch hole and to centre of a 15-inch circle. The Crank has Two True and Honest Speeds that can be shifted from shaft A to shaft B (or balance wheel shaft), precisely like all high-grade and high-priced drills, and not a blindfold imitation of a double speed drill made with a wooden handle riveted on the rim of the fly wheel, at a cost of just $1\frac{1}{2}$ cents, necessitating the blacksmith to have a helper, or turn the drill with the Left Hand, as one man operating must face the drill to do the work, giving one hand for motion and the other for oiling and handling the work. By referring to illustration it will be seen that the Gears on this Drill are all provided with Two Journal Bearings, one on each side, this being the most important feature to make a drill strong and powerful, and just where all cheap-made Drills are weak, as their main driving gear revolves on a simple stud, cheaply screwed into the weakest part of the backbone, which is not only cheap and flimsy in construction, but not practical, which none know better than the intelligent mechanic. Our Catalogue illustrates Five Heavier Drills equally as cheap as the above.



Champion 1890 Lever Blower.

Guaranteed King of all Blowers.

The 1890 is the only Double Geared Blower made. It will produce one-third more blast with 20 strokes per minute, than any other Lever Blower will produce with 30 strokes per minute, a labor saving of 600 strokes per hour, or 6000 strokes per day of 10 hours steady work. It works easy and noiseless. At a trial test a little girl six years old easily furnished the blast to put a welding heat on a 4-inch iron.

Dimensions of 1890 Blower: Fan, 16 inches; Wheel, 25 inches in diameter.

All our Champion Lever Blowers and Forges are supplied with our World Renowned Champion Lever Motion with a record of eight years' constant use, and without a single repair to our knowledge, and is now on more than 55,000 Blowers and Forges in every day use.

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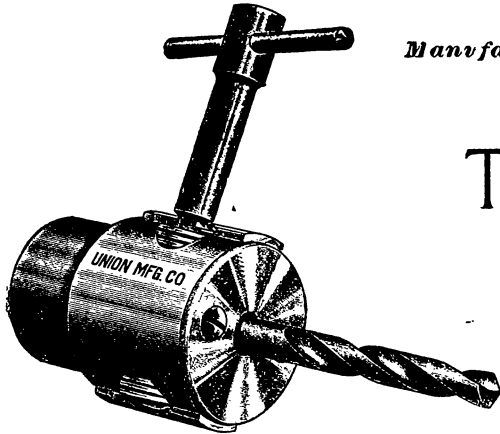
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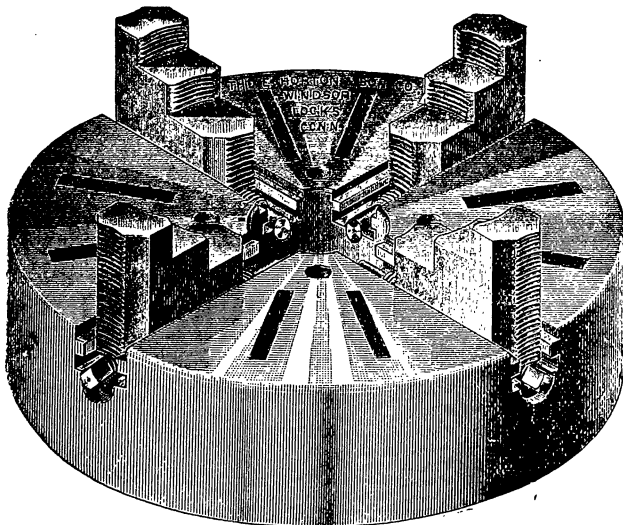
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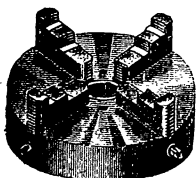
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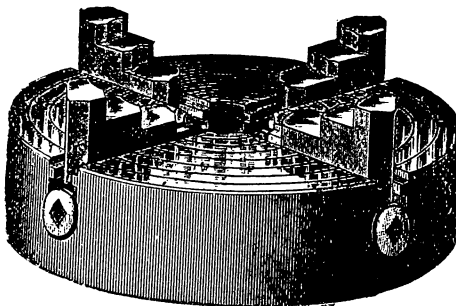


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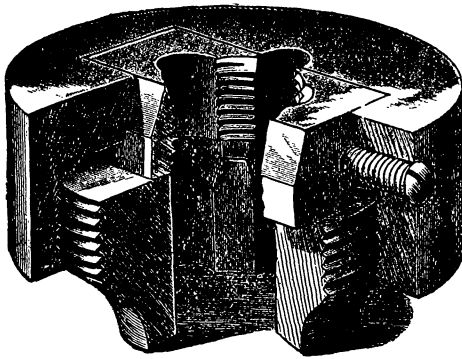


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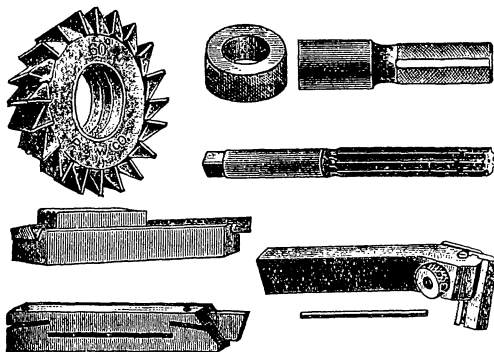


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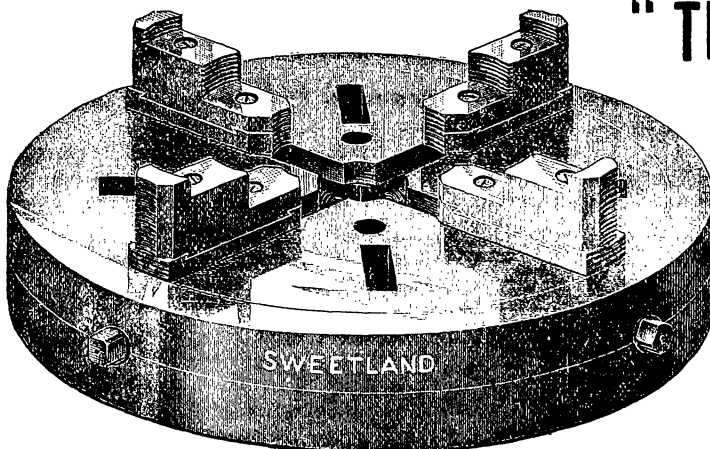
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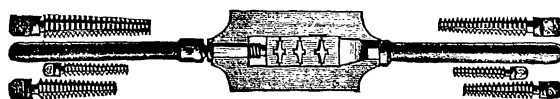
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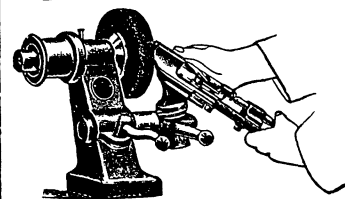


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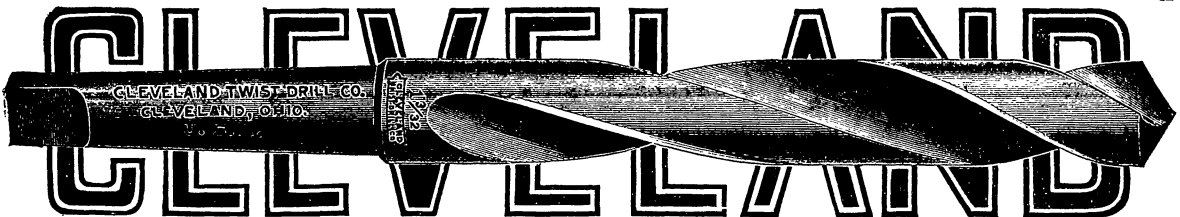
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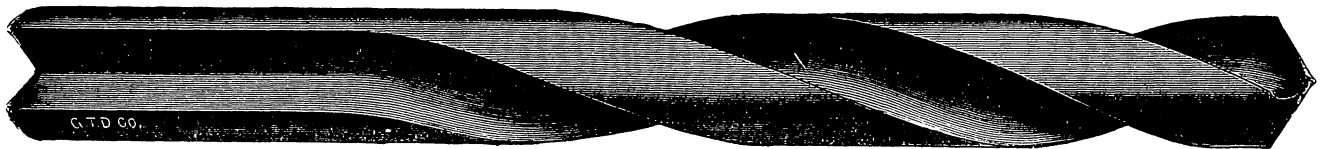
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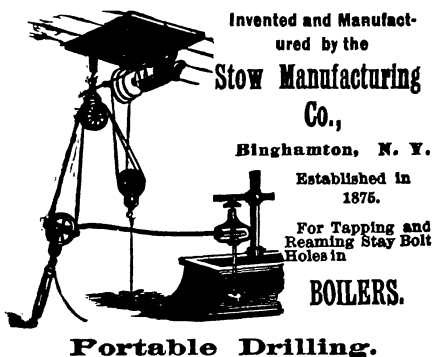
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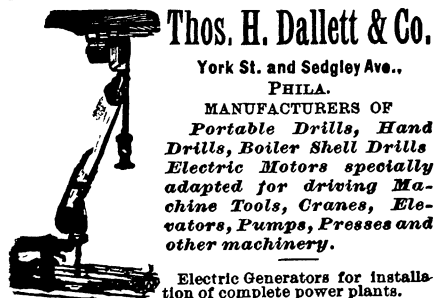
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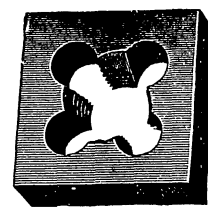
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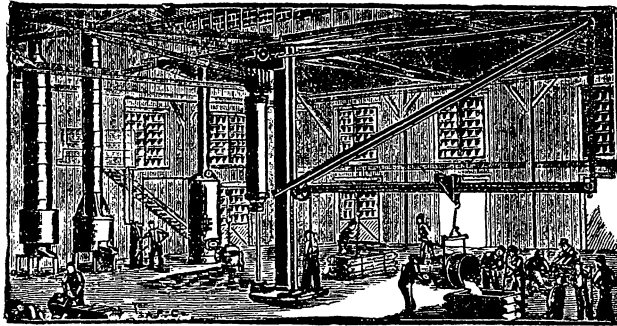
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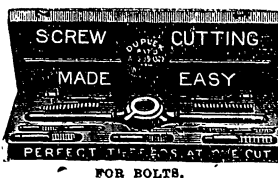
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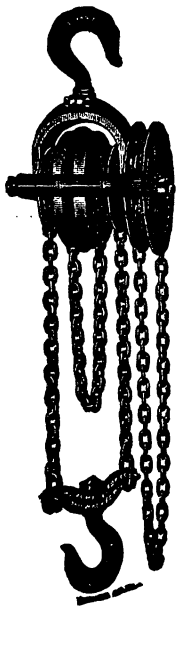
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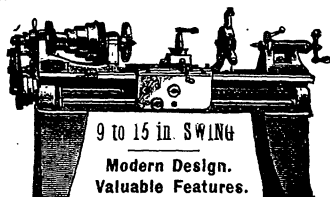
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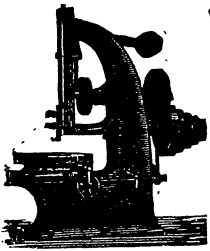
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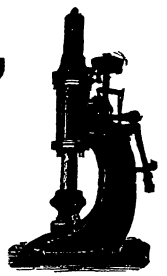
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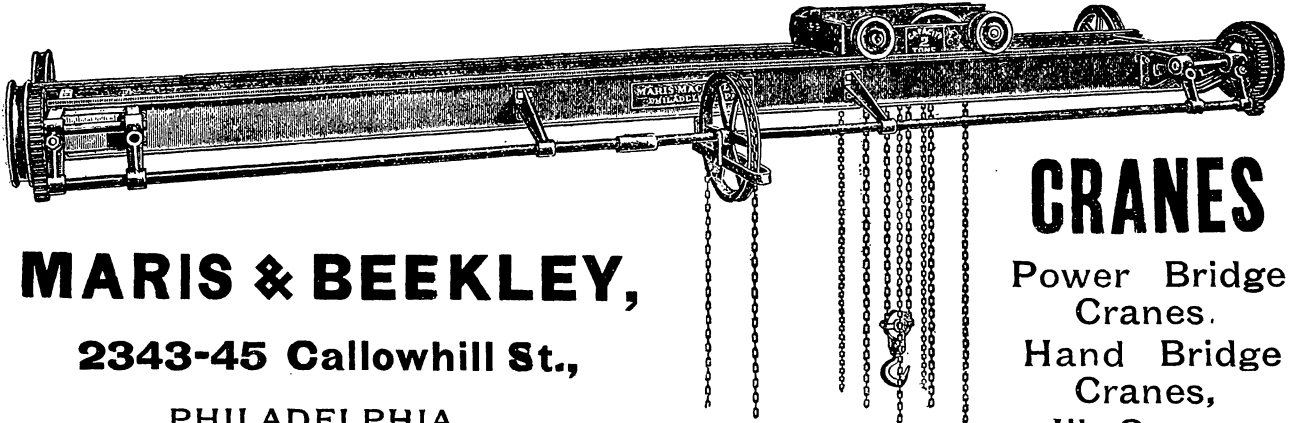
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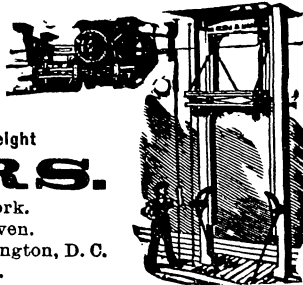
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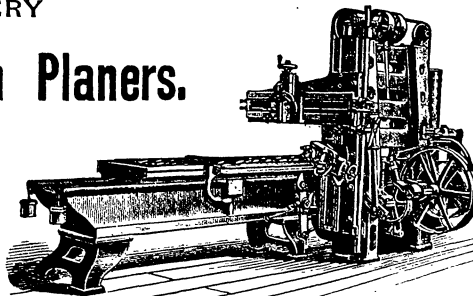
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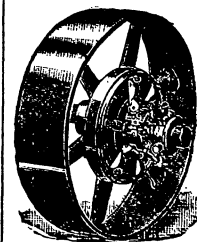
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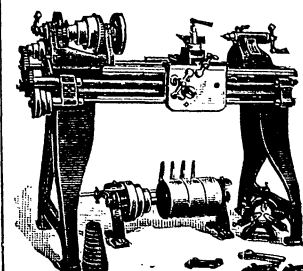


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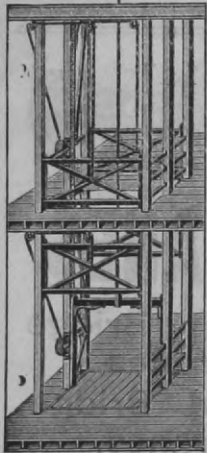
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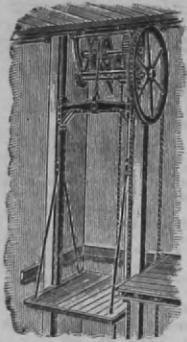
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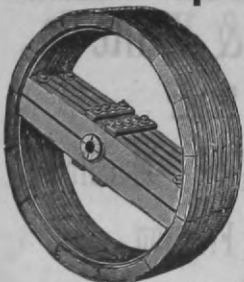
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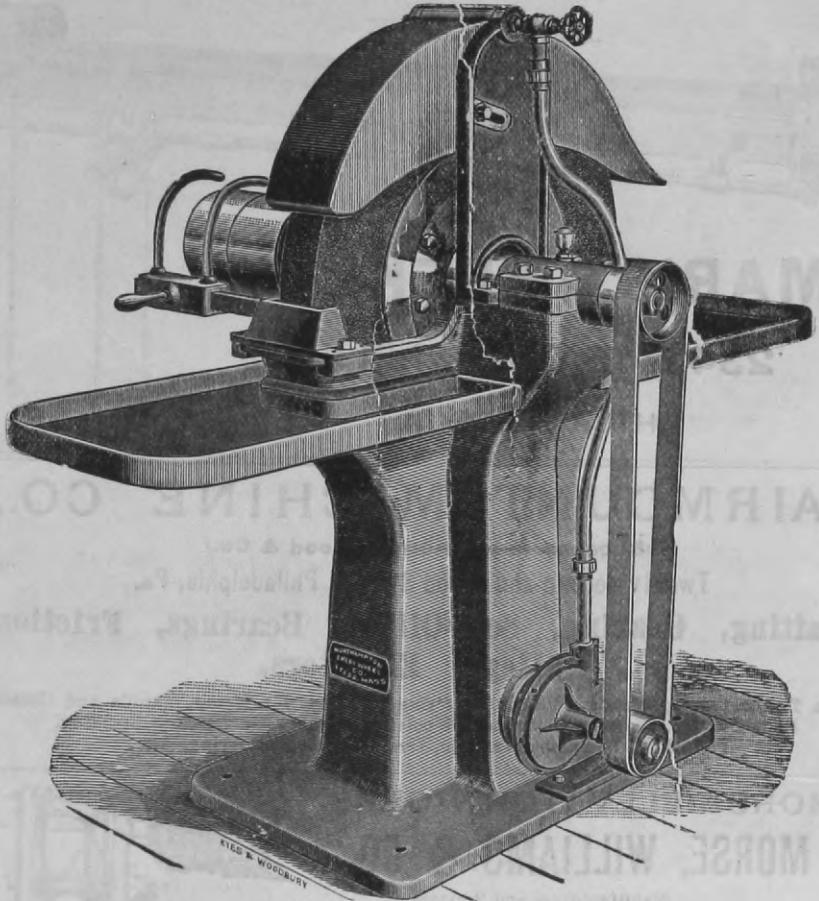
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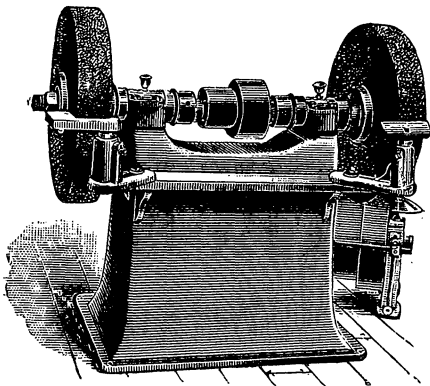
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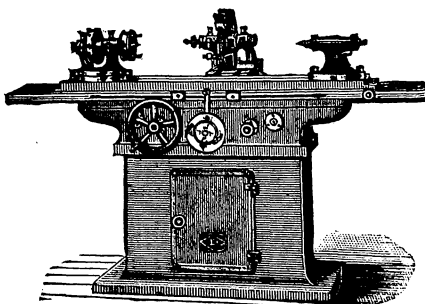
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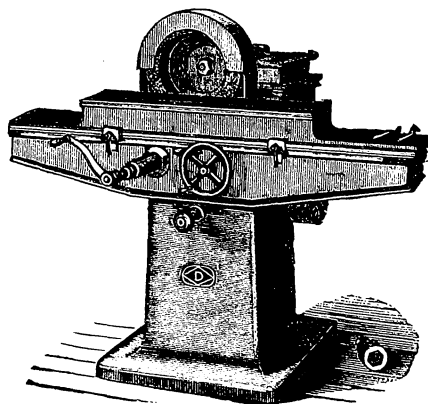
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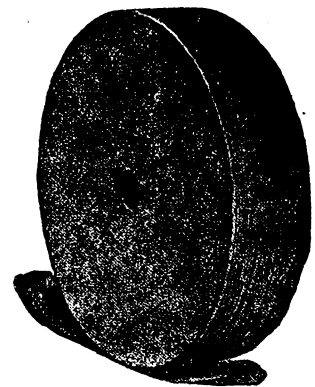


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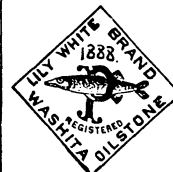
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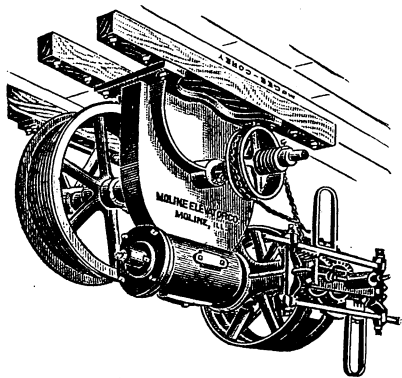
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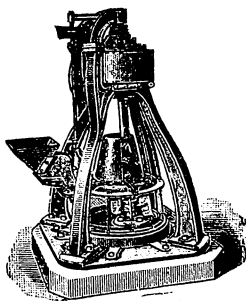
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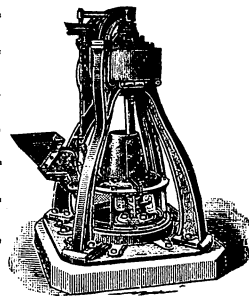
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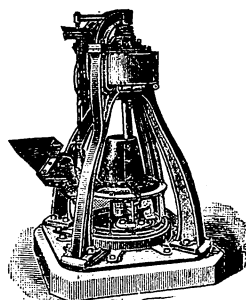
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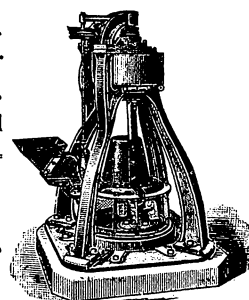
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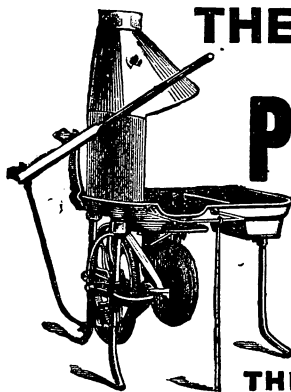
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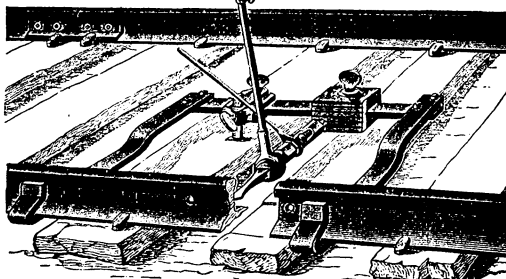
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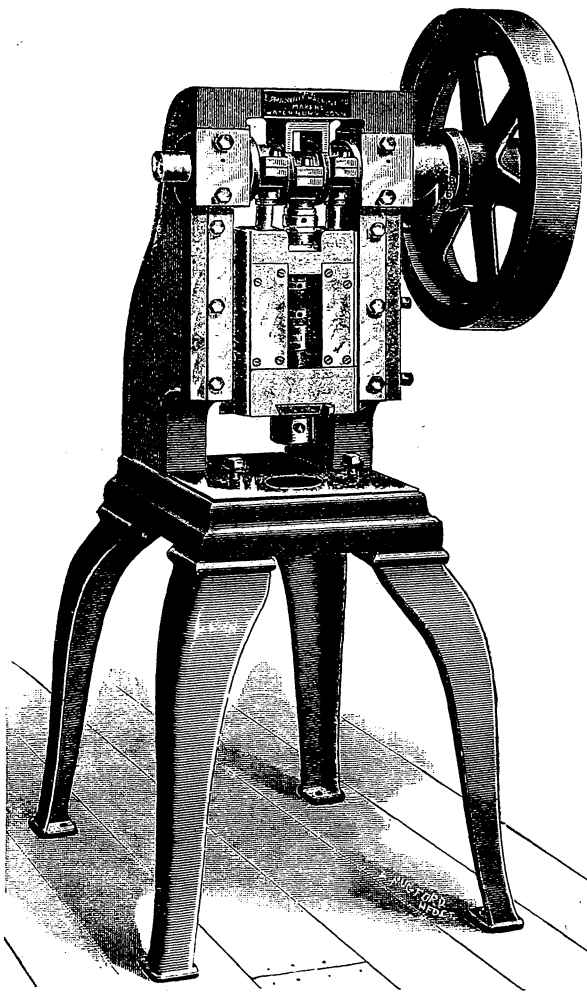
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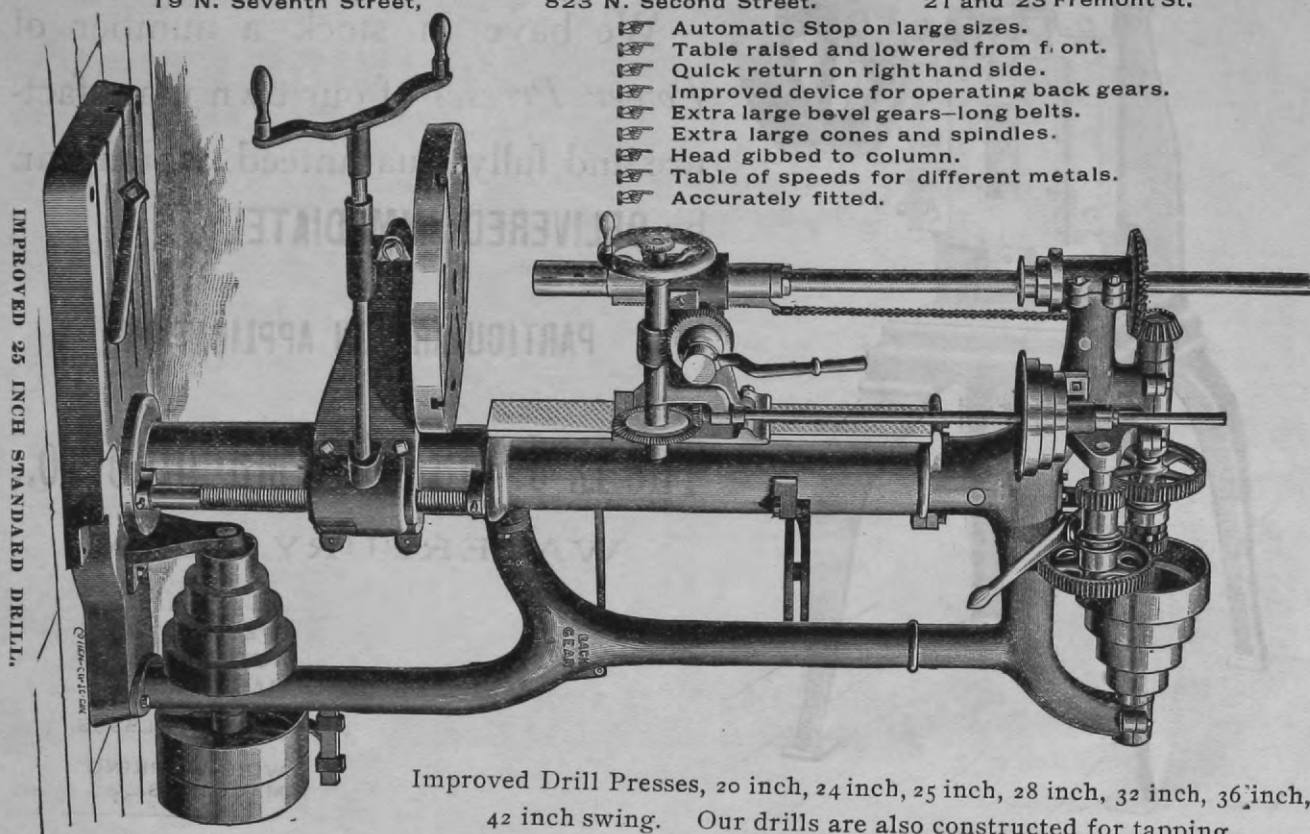
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- 1 15 H.-P. Engine. Good and Cheap.
- 1 7 H.-P. Boilers, Vertical. Cheap.
- 1 5 H.-P. Engine and Locomotive Boiler. Cheap.
- 1 10 H.-P. Engine and Locomotive Boiler. Cheap.
- 1 15 H.-P. Engine, Woodbury & Booth.
- 1 26 in. x 13 ft. Lowell Lathe. Heavy. Fair order.
- 1 20 in. x 8 ft. Gleason Lathe. Good order.
- 1 18 in. x 6 ft. Pond Lathe. Fair order.
- 1 17 in. x 6 ft. Putnam Lathe. Fair order.
- 1 64 in. x 16 ft. Lathe. Cheap.
- 1 18 in. x 5 ft. N. Y. S. E. Co. Lathe. Good order.
- 1 20 in. x 20 in. x 6 ft. Putnam Planer. Good order.
- 1 22 in. x 22 in. x 6 ft. Putnam Planer. Good order.
- 1 Sensitive Drill. State.
- 1 Strong Lever Drill. Good order.
- 1 Large Upright Drill. Old style. Cheap.
- 1 B. & S. Screw Machine, 8 in. swing. Good order.
- 1 B. & S. Head Finisher. Good as new.
- 1 B. & S. Head Slotter. Good as new.
- 1 16 in. Wood Lathes, complete with countershaft.
- 1 Chair Round Machine with countershaft.
- 1 No. 5 Boston Blower. Good order.
- 1 Gas Blast Furnace. Nearly new.
- 2 Jig Saws.
- 1 Shaper. Graham. First-class.
- 1 Double Head Shaper.
- 1 Single Head Shapers.
- 1 Chuck and Heads for Chair Rounds.
- 1 Gear Cutter, Gould. In good order.
- 1 200 Light Dynamo. Good order.
- 1 Shear and Punch combined. Light machine. New.
- 1 48 in. Boring Lathe. Good as new.
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- 1 Power Chain Hoist, with Heavy Chain, complete.
- 1 36 in. Band Saw.
- 1 24 in. Buzz Planer. Nearly new.
- 1 24 in. Pony Planer.
- 1 Boring Machine.
- 2 Wood Frame Saw Tables.
- 2 Horizontal Boring Machines.
- 1 Rowley & Hearnance Three-Sided Moulder.
- 1 H. B. Smith Double Head Tenoning Machine.
- 1 24-in. Planer and Matcher.
- 1 Rowley & Hearnance Power Mortiser.
- 1 H. B. Smith Three-Sided Moulder.
- 1 Sand Belt Machine.
- 2 Sand Drums.
- 1 Knapp Dovetailing Machine.
- 1 Steam Pump. Good order.

Send for Complete List of New and Second-Hand Machinery for Prompt Delivery.

W. P. DAVIS,
Rochester, N. Y.

LATHES.

- 1 15 in. x 5 ft. Windsor Lathe, Rise and Fall Rest. A1 condition.
- 1 17 in. x 6 ft. Fitchburg Lathe, Compound Rest. A1 condition.
- 1 16 in. x 7 ft., Bement, Plain Rest, heavy, fine Tool. A1 condition.
- 1 17 in. x 8 ft. Bialsdell, Rise and Fall Rest. Good as new.
- 1 13 in. x 4 ft. Prentice Bros. Turning Lathe. A1 condition.
- 2 10 in. x 3½ ft. Garvin Hand Lathes. Good as new.

PLANERS.

- 1 30 in. x 30 in. x 8 ft. Hewes & Phillips: one Head on rail; a fine, modern tool. Good as new.
- 1 40 in. x 36 in. x 10 ft. New Haven; one Head; heavy tool. Good order.
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- 1 15 in. x 16 in. x 3 ft., Wilkinson. A1 condition.

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- 1 No. 1 Garvin Universal Milling Machine. Good as new.
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 - 1 Merritt Heavy Back Geared Milling Machine. A1 condition.
 - 1 3-in. Hulbert & Rogers Cutting Off Machine.
 - 1 22-in. Gould & Eberhardt Automatic Gear Cutter. Good as new.
 - 1 Pratt & Whitney 2-Spindled Centering Machine. Good as new.
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 - 1 No. 3 Windsor Screw Machine; Wire Feed, Automatic Chuck; very complete. Good as new.
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 - 1 No. 2 Brown & Sharpe Surface Grinder. A1 condition.
- Nearly 500 New and Second-hand Tools in stock. Write us, we are always ready to trade.

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2 20 in. x 24 in. Ingersoll-Sergeant Straight-Line Improved Air Compressors, used comparatively short time, in excellent condition; ready for delivery.

1 24 in. x 60 in. Harris-Corliss Engine, left hand; fly wheel 18 ft. diam., 31-in. face; in good condition. To be replaced by compound; can be seen running. Delivery about May 1st.

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F. W. IREDELL,
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Great Bargains.

Must be Sold and Removed.

16 in. x 30 in. Horizontal Engine.

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24 in. x 36 in. Horizontal Engine.

19½ in. x 48 in. Beam Engine, with Knowles Condenser.

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SECOND-HAND MACHINERY.

One Putnam Planer, 26 in. x 26 in. x 8. Fine order.

One Car Axle Cutting off and Centering Machine.

One Pond Machine Tool Co. Iron Planer, 40 in. x 40 in. x 24 ft., with two heads. In fine order.

One Large Lathe, swings 78 inches over ways, and takes 9 feet between centers. Fine order.

One Ferris & Miles 500 lb. Steam Hammer. One Belden 100-lb. Upright Power Hammer.

One each 60 lb. and 80 lb. Bradley Helve Hammers.

Send for circular of Second-hand Machinery in stock.

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12 and 14 South Canal St., Chicago, Ill.

LATHES IN STOCK:

18 x 6,
18 x 8,
21 x 10.

Hendey Make. Get price.

THE SCRANTON SUPPLY AND MACHINERY CO.,

Scranton, Pa.

SOME BARGAINS HERE.

- 1 32 x 32 x 9 New Haven Planer
 - 1 Hendey Shaper, 15 in. stroke, imp. vise; new.
 - 1 30 x 30 x 3 New Haven Planer.
 - 1 14 x 6 Screw Cutting Engine Lathe; new.
 - 1 26-in. Diamond Auto. Knife Grinder, used 1 month.
 - 1 26-in. " Face
 - 1 No. 1 " Universal Face and Angle Grinder, used 1 month.
 - 1 8-Spindled Garvin Drill Press used 1 month.
 - 1 16-in. Crank Shaper.
- And other machinery, new and second hand. Write for prices. **Machinists' Supply Company,** 39, 41 and 43 Central Ave., Rochester, N. Y.

FOR SALE.

Centre and Side Bearing Steel Street Rails,

All fit to relay and in lots to suit. Apply to

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MACHINERY,

NEW AND SECOND-HAND. FOR SALE.

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- 50 in. " 30 ft. " For Rolling Mill Forgings. New
- 30 in. " 28 ft. " Pond Mach. Tool Co. Shafting
- Lathe. A1.
- 32 in. " 12-14-18-18 ft. Beds. New.
- 28 in. " 12-14-18-18 ft. " " " " "
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- 15 in. " 6 and 8 ft. " " " "
- 14 in. " 8 ft. " " " "
- 15, 18 and 25 in. stroke Crank Shapers, Steptoe. New.
- 22, 26 and 30 in. " Geared " " " " "
- 9 in. 16 in. " Crank " Good order.
- 24 in. " " Hendey " " " " "
- 20 in. 32-24-28-30-36 in. Drills. New and Second-hand
- 24 in. x 4 ft. 5 ft. 6 ft. Planers.
- 26 in. x 6 ft. and 33 in. x 8 ft. Planer.
- 36 in. x 8, 10 and 12 ft. Planer.
- 38 in. x 12 ft. and 14 ft. Planer. New Haven.
- 64 in. x 48 in. x 24½ ft. Planer.
- 62 in. x 48 in. x 17 ft.
- 72 in. x 48 in. x 30 ft. Planer, 2 heads, side planing attachment.
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STEAM PUMPS.

- 1 14 in. x 9 in. x 18 in. Cameron; brass lined.
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 - 1 16 in. x 9 in. x 18 in. Niagara.
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 - 1 14 in. x 12 in. x 18 in. Blake
- Send for new catalogue.

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SECOND-HAND MACHINERY.

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| CORLISS ENGINES. | AUTOMATIC CUT-OFF. |
| 30 x 60 Harris-Corliss. | 24 x 36 Babcock & Wilcox. |
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| 12 x 24 Wetherill-Corliss. | SLIDE VALVE |
| 10 x 24 G. H. Corliss. | ENGINES. |
- 20 & 40 x 60 Cross Compound Corliss.
14 & 22 & 36 x 24 Triple Expansion Propeller Engine.
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16 x 18 High Pressure Link Motion Propeller Engine.
8 & 16 x 16 Fore and Aft Compound Propeller Engine.
4 & 7 x 5 Fore and Aft Compound Propeller Engine.
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Boilers, Pumps, Dynamos and

GENERAL MACHINERY.

MARVIN BRIGGS, 61-63 Rutgers Slip, N. Y.

SECOND-HAND MACHINERY.

Boring Mill, 10 ft. 4 in. swing, 56 in. under cross rail, table 7 ft. 6 in. in diameter.

Boring Mill, 8 ft. 4 in. swing, 48 in. under cross rail, table 6 ft. 6 in. in diameter, two heads on cross rail.

Two 7-ft. Engine Lathes, 7 ft. between centers, face plates 6 ft. 3 in. in diameter.

76-in. Planer, 18 ft. long; heavy and powerful.

48-in. Car Wheel Borer.
Axle Lathe.

Write for photographs and further particulars.

Eastern Branch,
NILES TOOL WORKS CO.,

138 Liberty St., New York

FOR SALE.

Corliss Vertical Engine, cylinder 32 x 60, latest pattern, high speed; suitable for rolling mill or electric light work. Address **NATHAN BENHAM,** Hartford, Conn.

!!! FOR SALE !!!

BAKER BLOWERS, Nos. 1, 3, 4, 4½, 5, 6 and 7.
ROOT BLOWERS, Nos. 1, 2, 3, 4, 5, 6 and 7.
 Sturtevant Blowers, Nos. 5, 7 and 8.
 2 12 and 1 15 H.-P. Horizontal Boilers; new, very cheap. 10 in. x 7 in. Blake Crusher; equal new. Corliss Engine, band wheel in halves, 12 ft. x 24 in. x 9 in. hole. 1 large Bunker & Boschert Press. 1 Norara Fly Wheel Pump, 14 in. x 7 in. x 10 in. brass lined.
 Purchasers of machinery and those who have it for sale will do well to correspond with C. R. BIGELOW, Machinery Expert and Appraiser, 45 Dey St., New York City.

OLD BOILERS WANTED.

We cut them up for Scrap Iron.
 Will buy old Boiler Plate in rings and sheets 1-4 in. thick and upwards.

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BARGAINS IN MACHINE TOOLS.

1 30 in. x 30 in. x 8 ft. Pease Planer, latest make.
 1 12 in. x 5 ft. Young Engine Lathe.
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Corliss Engine, 14 x 36; first-class condition.
 Plain Engine, 12 x 30; good order.
 Belt Wheel, 8 ft. diam., 20 in. face, 7 in. bore.
 Belt Wheel, 10 ft. diam., 13 in. face, 6½ in. bore; split.
 Belt Wheel, 11 ft. diam., 18 in. face, 13 in. bore; split.
 2 Sturtevant Fans, 8 ft. high.
 Clutch Pulley, 60 in. diam., 23 in. face, 5 7-16.
 Large assortment New and Second-hand Machinery
 Shafting, Pulleys, Belting, Tools, Iron, &c.

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Great Bargain.

A full set of Automatic Cut-off Engine Patterns, with drawings, wood cuts and patent right to manufacture; are almost new, and were made by the finest workmen. If sold at once will let them go at a sacrifice. Address "ENGINE," No. 112, office of *The Iron Age*, 96-102 Reade street, New York.

FOR SALE.

5 Centrifugal Pumps.
 2 3 H.-P. Engines. New.
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 8 20 H.-P. Engines, also up to 80 H.-P. New.
 10 5 and 10 H.-P. Gas Engines. New.
 12 Drill Presses, new, different sizes.
 800 Truck Wheels, new, 1½ cts., New York.
 All guaranteed fully.
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Four second-hand 75 H.-P. Double-Deck Boilers, with all fittings and fixtures. In first-class condition. Cheap.
 Two 2-flue Boilers, 48 in. diam. x 32 ft. long, in prime condition. Cheap.
 One 16 x 22 Side Crank Engine.
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 Full line of new and second-hand Boilers and Engines always on hand.
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One 16 x 24 in. Standard Gauge Locomotive.
 One 15 x 20 in. Standard Gauge Locomotive.
 One 7 x 12 in., 36-in. Gauge Locomotive.
 Fire Box Boilers from 1 to 15 horse-power in stock; Engines, Boilers, Shears.
 Hoisting Engines, Derricks and Contractors' Machinery.

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SECOND-HAND ROLLING MILL MACHINERY WANTED.

One Hor. Engine, 24 in. x 28 in., 15-ton wheel.
 12-in. three-high Merchant Train Rolls.
 18-in. Break Down Train.
 One Hot Turning Lathe.
 One Heavy Scrap Shear to cut rails.
 One Fan Blower and Hot Iron Saw.
 Two small Engines.
 Address, with prices, "X," office of *The Iron Age*, 220 South 4th St., Philadelphia.

WANTED.

Chemist. Apply to
ADDYSTON PIPE & STEEL CO.,
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Large lot of Loco. Boilers,
 50 to 100 H.-P., in first-class order.

Can furnish stacks, grates and all fittings to suit purchasers.

CHESTER BERTOLETTE & CO.,
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FOR SALE. PUMPS, ENGINE & BLOWER.

1 Cameron Pump, No. 12 Special.
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 13 in. x 12 in. Vertical Engine.
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DAN'L W. RICHARDS & Co.
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2 Double Deck Boilers about 40 H.-P. each, good and cheap. 2 Iron Tanks, 8 ft. in diameter, 30 ft. long, 3-8 iron, 11,000 gallons capacity. Cylinder Boilers for Stacks, 40 and 42 in. diameter. Other Stacks from 10 in. up to 20 and 30 ft. long. Hoisting Engine. Round and Square Iron Tanks, different sizes. Dealers in all kinds of Scrap Iron, New and Old Metals and Machinery.
BUSSENIUS & CUNLIFFE,
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CRANK and GEARED SHAPERS.
 Write us for Bargains.
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 Plate Mill suitable for nail works. For particulars, &c., address
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In lots to suit.

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25 lb. section iron T Rails in good condition for relaying.

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Extra strong, with engine attached 17 x 24 in. Weight of Squeezer alone 96,000 lbs. In use two years. For further particulars address

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Scrap For Sale.—Bids Wanted.

100 tons Malleable Iron Scrap.
 125 tons old Sand and Chilled Rails.
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 100 tons old Boiler Plate, cut apart.
 Old Wrought Pipe, No. 1. Wrought Heavy Scrap, &c.
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CORLISS,

Wright, Porter-Allen, Buckeye and Slide Valve Engines, Boilers, Pumps, &c.

20 x 48 Corliss Engine. 16 x 36 Slide Valve Engine.
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 30 x 72 Corliss Engine. 16 x 48 Slide Valve Engine.
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 11 x 20 Buckeye Engine. 14 x 80 Porter-Allen Engine.
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 60 H.-P. Westinghouse S and d Engine, almost new.
 25 H.-P. Westinghouse Junior Engine, in good order.
 8 x 25 Brennan Crusher, good as new.
 90, 80 and 60 H.-P. Horizontal Boilers, insured 80 lbs.
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 Woodward Steam Fire Pump, 1000 gallons capacity.
 Worthington Duplex Pump, 10 x 6 x 10.
 Niagara Pressure Pump, 12 x 6 x 12.
 Blake Pressure Pump, 10 x 6 x 12.
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 Three Ingersoll Rock Drills. One 8-ft. and one 9-ft. Blower.
 Corliss Jet Condenser, 600 H.-P. Two Buckley Condensers, 600 H.-P. each.
 Two Blake Duplex Pumps, 6 x 4 x 7.
 One Blake Pump.
 Emery Grinder. Borving Bar. Two Platform Scales.
 Boiler Iron Tanks, 800 and 200 gallons capacity.
 Automatic Sawdust Feeder. 100 ft. of 7-in. Pipe.

GEORGE M. CLAPP,

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Relaying Rails and Narrow Gauge Equipment For Sale Cheap.

360 tons 35 pound Iron Tees, with Fastenings.
 500 " 30 " " " " "
 300 " 48 " " " " "
 50 " 16 " " " " "
 250 " 52 " Johnson Girder Steel Rails, with Chairs.
 1000 tons Flat Steel Street Rails.
 200 Narrow Gauge Flat, Coal, Box and Stock Cars; 5 Coaches, 7 Cabovers, 4 Mail and Baggage, 10 Boarding 30 Hand and Push Cars and 7 Standard Gauge Locomotives.
 I am in the market at any time to buy or sell anything in the way of second-hand Equipment or Rails, also Scrap. In answering this mention this paper.

L. K. HIRSCH,

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For Sale or Rent.

Rolling Mill and Nail Factory of the Lewisburg Iron and Steel Co. Mill supplied with water, slate roof buildings, 2 engines, 4 large tubular boilers, 7 puddling furnaces, 1 large heating furnace with boiler over same, 42 nail machines, 2 trains of rolls, and other machinery. Connection with Pennsylvania R.R. and Philadelphia & Reading R.R. by switches on both sides of mill. Works now in operation. Address
ALFRED HAYES, Secretary,
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FOR SALE.**IRON WORKS IN CHICAGO,**

About one mile from Court House.

Foundry, Machine Shop, Pattern Shop, Blacksmith's Shop, &c.

Address

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Office of *The Iron Age*, 59 Dearborn St., Chicago

BARGAINS.

16 in. x 36 in. Corliss Engine.
 12 in. x 24 in. Corliss Engine.
 20 in. x 30 in. Plain Slide Valve.
 12 in. x 15 in. Plain Slide Valve.
 14 in. x 16 in. Vertical Engine.
 12 in. x 14 in. Vertical Engine.
 60 in. x 18 ft. Horizontal Boiler. New.
 30 in. x 12 ft. Lathe.
 15-ton Ice Plant.
 Large stock of New Engines, Boilers, Machine Tools and Supplies.

FRANK TOOMEY,

131 North Third St., Philadelphia, Pa.

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One Knowles Improved Fly Wheel Compressor. In use but a few weeks; 8-in. steam cylinder, 10-in. air cylinder, 12-in. stroke; water jacketed air cylinder. Address
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LARGE SECOND-HAND TOOLS FOR SALE. IMMEDIATE DELIVERY.

One Engine Lathe, 52 in. swing, 35 ft. bed, chuck, face-plate. Has large, powerful Horizontal Boring Mill on one end of bed; is virtually two machines on one bed.

One Engine Lathe, with two triple geared heads, tail stock and carriages, 60 in. swing on bed 45 ft. long in two pieces, screw whole length of bed on one side and half the length of bed on other side.

One Engine Lathe, 42 in. swing, triple geared, 20 ft. between centers. made by Betts Machine Co.

One Planer, 84 in. wide, 84 in. high, 16½ ft. long, two heads on rail and one side head. Niles Tool Works.

One Large Vertical Cylinder Boring Mill, with separate engine to drive same, well adapted for marine or other heavy work.

One O'Brien's Patent Circular Boiler Head Flanging Machine.

SEND FOR LIST.

Geo. Place Machine Co.,
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STATIONARY OR MARINE ENGINE WANTED.

A second-hand Compound Condensing Engine in Al' condition, capable of developing 500 to 1000 H.-P. at a speed of from 150 to 250 revolutions per minute under a steam pressure of say 100 lbs. State maker's name, when built, how much used and where can be seen. Give full description and state lowest spot cash price. Address

THE WILMOT & HOBBS MFG. CO.,
Bridgeport, Conn

WANTED.

Responsible parties to manufacture and sell on royalty, a cheap portable steel or iron **CULVERT BRIDGE**; it is adapted to all small streams, runs, etc., in roads, streets, **RAILROADS**, etc.; improved roads is the order of the day; use this bridge, put it below the level of the road, cover it over and thus prevent jarring and wear and tear of vehicles, etc. Apply to
W. A. NICHOLS,
Girard Building, Philadelphia, Pa.

FOR SALE.

One 50-ton Fly Wheel, about 26 ft. 6 in. diameter, in 12 sections or segments; diameter of eye, 24 in. Wheel made by Robinson, Rea & Co. of Pittsburgh, Pa.
Address

THE BROWN-BONNELL IRON CO.,
Youngstown, Ohio.

The Mary Pratt Fur- nace Co. Property,

located at Birmingham, Ala., consisting of one modern well equipped 60-ton blast furnace, 30 acres of land, railroad tracks, operatives' houses, &c., will be sold at auction on the premises at about 11 o'clock a.m., March 9th next. This furnace has been successful and is sold under decree of court to make division and settlement among stockholders.

Z. L. NABERS, Receiver,
P. O. Box 841,
Birmingham, Ala.

ICE PLANT,

20 tons, for sale low before removal; with Corliss engine 14 x 30, tanks, piping, filter, &c. Would be sold together or separately by

A. PURVES & SON,
South and Penn Sts., Philadelphia.

WHERE TO LOCATE NEW FACTORIES.

The Illinois Central Railroad Company is desirous of calling the attention of capitalists and manufacturers to the advantages possessed by the different cities and towns on their Southern Lines and on the lines of the Yazoo & Mississippi Valley Railroad Company in the shape of

UNLIMITED RAW MATERIAL, PROXIMITY TO MARKETS, CHEAP LABOR,

Fuel, etc., and believes that it needs but a presentation of their merits to attract the careful attention of all interested in converting the raw materials to be found on their lines into the finished product. Prominent among these are cotton, hard and soft wood, clay, fruits, vegetables, etc. A descriptive pamphlet of 150 pages, entitled "Where to Locate New Factories," has been issued by the Company, and a copy will be sent free on application to the undersigned, who will also give any further information as to

Inducements Offered

by the different localities for desired industries. Individuals or companies wishing to embark capital in cotton, clay, wood-working, canning or other industries, can find a profitable field and hearty co-operation. For particulars address GEO. C. POWER, Industrial Commissioner I. C. R. R., 58 Michigan Ave., Chicago.

ADMINISTRATORS' SALE —OF— STOCKS

The undersigned, administrators, with will annexed, of estate of Thomas W. Means, deceased, will sell at public auction, at the Ashland National Bank building, Ashland, Boyd County, Kentucky, on the

Fifteenth Day of March, 1893,

at 1 o'clock P.M.,

One hundred and seventy-five (175) shares of One Thousand (\$1000) Dollars each, being five-eighths of the entire capital stock of **THE MEANS & RUSSELL IRON COMPANY**, a corporation chartered by the State of Kentucky, with office at Ashland, Kentucky.

[The company owns about twenty-seven thousand (27,000) acres of valuable bituminous and cannel coal, iron ore, fire-clay, timber and land in Boyd and Greenup counties, Kentucky; operates one charcoal furnace, "Belle Fonte," has sufficient working capital. The Chesapeake and Ohio and the Ashland Coal and Iron Railroads pass through the property.]

Two hundred and ten (210) shares of One Thousand (\$1000) Dollars each, being twenty-one fifths of the entire capital stock of **MEANS, KYLE & COMPANY**, a corporation of the State of Ohio, with office at Hanging Rock, Ohio.

[The company owns about twenty-four thousand (24,000) acres of valuable coal, fire-clay, iron ore, timber and farming lands in Lawrence and Scioto counties, Ohio. Operates one charcoal furnace, "The Grove," and one coke furnace, "Hamilton." Has sufficient working capital. Operates a standard-gauge railway from its mines to Hamilton furnace, to the coal tipples on the Ohio River, and to the Norfolk and Western Railroad at Hanging Rock.]

SEVENTY (70) shares of FIFTY (\$50) DOLLARS each of **THE PORTSMOUTH GASLIGHT COMPANY**, of Portsmouth, Ohio.

TWELVE (12) SHARES of One thousand (\$1000) Dollars each of the **NORTON IRON WORKS**, of Ashland, Kentucky.

TERMS CASH, or upon credit of three months, if bond with approved security be executed by purchaser for purchase price, bearing interest from date of sale. For further information address

T. M. ADAMS, and E. C. MEANS,

Administrators, with will annexed, of estate of Thomas W. Means, deceased, Ashland, Kentucky.

FOR SALE.

Hardware business in a city of 40,000. Best location. Stock will invoice about \$10,000. Annual sales \$30,000, which can be increased readily. Present owner is engaged in other business and can give this no personal attention. Favorable terms. Address

J. C. PETERS,
Fort Wayne, Ind.

FOR SALE.—Manufacturing Interest.

Parties desiring to change their business relations will sell their stock in a well established, prosperous and growing corporation located in Chicago, manufacturing specialties and a staple line of steam and plumbing goods. The stock earns large dividends annually and is an excellent investment. Full particulars upon application. Address "STOCK," office of *The Iron Age*, 59 Dearborn St., Chicago.

Locations for Factories.

The trend of manufacturing is Westward, and among all manufacturers there is a latent feeling that the West as a territory for the manufacture of goods presents features unexcelled by any other section in the Union.

The eight States traversed by the 4150 miles of the **Chicago, Milwaukee & St. Paul Railway's** tracks (Illinois, Wisconsin, Northern Michigan, Iowa, Missouri, Minnesota, South Dakota and North Dakota) possess, in addition to the advantages of raw material and proximity to markets, that which is the prime factor in the industrial success of a territory—a people who form one live and thriving community of business men in whose midst it is safe and profitable to settle. Many towns on the line are prepared to treat very favorably with manufacturers who would locate in their vicinity.

In addition to the vast agricultural resources, its territory comprises forests of hard and soft woods, mines of iron and other metals, coal and other minerals, quarries, clays of all kind, tan-bark, flax and other raw materials. Water-powers (both river and artesian) are also still available.

A number of new factories have been induced to locate—largely through the instrumentality of this Company—at towns on its lines.

The central position of the States traversed by the **Chicago, Milwaukee & St. Paul Railway** makes it possible to command all the markets of the United States. The Industrial Department promptly furnishes practical information to manufacturers. As it is to the interest of the road to secure the location of industries at places where the surroundings will insure their permanent success, the information furnished a particular industry is pertinent and reliable.

LUIS JACKSON,

Industrial Commissioner, C. M. & St. P. Ry.,
160 Adams St., Chicago, Ill.

FOR SALE.

FOUNDRY!

Or can be used for any kind of
Manufacturing Purposes.

East Chicago, Ind., on the Belt R. R. (with several trunk lines); track on the premises main building, 90 x 180 feet; annex, 28 x 90; engine room, 24 x 26; melting room, 22 x 43; machine shop, 50 x 50 feet; 6 swinging cranes; elevated track for handling heavy machinery; Sturtevant blasting fans; 2-story office, 14 x 16 feet. Buildings new and thoroughly constructed of iron and brick. Ten acres of land, with railroad tracks on land and new canal across one end, giving water connection to Lake Michigan and Calumet River.

East Chicago has sewers, water, gas, electric light, new opera house and is growing fast.

Will sell with part of land or all, or remove such machinery as purchaser does not want. Price, as it stands, \$60,000. Terms satisfactory.

V. H. SURCHNOR,

85 Dearborn St., Room 310,
CHICAGO, - - ILLINOIS.

The Best Opening in the United States

For an exclusive wholesale Hardware house can be found in the city of Tacoma, Washington. For particulars call on or address

E. L. SHAFNER, Sec'y Commercial Club,
Tacoma, Wash.

WANTED. Something to Manufacture.

A Brooklyn manufacturer of light hardware, having first-class facilities, desires to manufacture some specialty or patented article to be finished complete from raw material, if necessary. Address "RESPONSIBLE," office of *The Iron Age*, 96-102 Reade St., N. Y.

FOR SALE.

Complete stock of Hardware, Stoves and Tinware, with tinshop attached; best location in Central Pennsylvania; good reasons for selling. Address "COMPLETE STOCK," office of *The Iron Age*, 96-102 Reade St., N. Y.

FOR SALE.

Second-hand Machinery, Pulleys, Shafting and Belting.
Two Slide Valve Steam Engines,
20-inch cylinders, 48-inch stroke.

These engines are geared at right angles and placed upon extra heavy iron frames, w to wrought-iron shaft on which there is a 9-foot spur wheel geared into a 3-foot pinion wheel of corresponding strength. Also one battery of five steam boilers each 24 feet long, 42 inches in diameter, with two 16-inch flues in each, complete. 2000 feet shafting, assorted lengths, diameter from 1 1/4 to 4 inch. 5, 60 assorted iron pulleys from 6 inches to 6 feet in diameter and from 6 to 18 inches on face. 400 iron hangers to suit shafting, one lot of good leather belting from 4 to 18 inches in width. All the above in first-class condition and for sale at a low figure in large or small lots to suit the purchaser.
The Faber Machinery Supply Co., Pittsburgh, Pa.

FOR SALE.

Complete Bessemer Plant, second-hand, by Galloways, Manchester. Only done 18 months' work. Consisting of one pair of High Pressure Vertical Blowing Engines, Cylinders 30 inch steam, 42 inch air, 4 feet stroke. Hydraulic Pumps, Accumulator, two eight-ton Converters, One Hydraulic Centre Pit Crane complete and two five-ton Ingot Cranes, Distributing Boxes, Cupolas, Cupola Staging, Lift and Casting Ladles complete.

Drawings and fuller particulars on application to

THOMAS W. WARD,
Fitzalan Chambers, Sheffield, England.

FOR SALE.

Complete outfit, Patterns, Dies and Tools, for making Solid Steel and Steel Laid Shears. Also a quantity of partly finished goods and material. The above to be sold at a bargain. Address

THE NORWICH LOCK MFG. CO.,
Norwich, Conn.

FOR SALE.

The factory property in Norwich, Conn., formerly occupied by the Norwich Lock Mfg. Co., consisting of about two (2) acres of land (eligibly located, alongside of Railroad) and brick buildings containing about 35,000 feet of floor space. Piped for water and steam and containing a first-class Engine, Boiler and 2 Cupolas for melting iron. Will be sold on favorable terms. For particulars, address

THE NORWICH LOCK MFG. CO., Norwich, Conn.

WANTED.

A second-hand Fox Lathe, with turret head, chasing bar, set-over motion, back gear, complete for brass working.

KEYSTONE METER CO.,
Royersford, Pa.

WANTED.

A well established company, manufacturing gas and gasoline motors for stationary, marine and all other purposes on a large scale, is prepared to open agencies in principal cities in the United States. Responsible parties wishing to secure territory will please address, with full particulars as to standing and references, "MOTOR,"

P. O. Box 2920, New York City.

Will Sell or Lease.

Foundry and Machine Shops, with tools, patterns, stock on hand, &c First-class water power; no steam required. A rare opportunity for general or special work. Address

P. O. BOX 230, Milford, Del.

Power Hammer For Sale.

A 100-pound Bradley Strap Hammer of latest type; has been used but a few weeks and is in perfect order.

MENEELY BEARING CO.,
West Troy, N. Y.

WANTED.

One 300-lb. Trip Hammer; must be in first-class order. Address
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office of *The Iron Age*, 96-102 Reade St., N. Y.

FOR SALE AT ROCKAWAY, N. J.

A valuable Mill property in first-class condition, on the line of the D. L. & W. and N. J. Central Railroads, containing 14 acres of land, water and steam power, two turbine wheels, one large mill suitable for axe or machinery works, three new two-story blacksmith, machine and pattern shops, three dwellings, dynamo and other buildings. The water is pure and suitable for silk or paper factories or dye works. Apply to W. A. TORREY, 6 Wall St., New York

MACHINERY STEEL.

5/8 x 7-16	1 1/2 x 5/8
3/4 x 1 1/2	1 3/4 x 1 1/2
3/4 x 7-16	1 3/4 x 5/8
1 1/2 x 3/4	2 x 5/8
1 3/4 x 5-16	2 1/2 x 1/4

If interested in these sizes write to
CHARLES C. LEWIS,
Iron and Steel Merchant,
Springfield, Mass.

WANTED.

Second-hand Power Press in good condition. Also Planer or Shaper, 3 or 4 ft. Spot cash.
ROBLEY & BRUNDAGE,
142 Chambers St., New York.

FOR SALE

The Vulcan Iron Works, located at Oswego, New York, has a large and prosperous business in the manufacture of dredges steam shovels, marine pumps, &c., &c.; also have a large jobbing business. This is an old and thoroughly established concern, and will be a very profitable investment for the right man. Terms of suit purchaser. The only reason for selling is that the owner is advancing in years, and his health being poor, desires to retire from active business. Address B. F. CHASE, Chicago, Ill., or R. H. KING, Oswego, N. Y.

Nail Machines.

Outfit complete wanted for making 50,000 to 100,000 kegs cut nails per annum. A good second-hand outfit preferred. Give full description and lowest cash prices. Address

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Office of *The Iron Age*, 96-102 Reade Street, N. Y.

WANTED.

A complete set of Plates for a 10 or 12 inch Mill Heating Furnace. State price and condition. SLATINGTON ROLLING MILL CO.
Slatington, Pa.

WANTED.

Pneumatic Riveter, Allen's Jaw Riveter preferred, for 3/8 rivets. Also Air Compressor to suit. Address "M. & CO.," No. 32, office of *The Iron Age*, 96-102 Reade St., N. Y.

Patented and other Specialties Introduced.

Am prepared to put any article in the regular or special line of trade on the market within a specified term of years. If wished, will also assume the general management of entire introductory department, including advertising. Do my own traveling and cover the entire United States. After I examine the line in all its departments will make specific offer; will not handle any article at any price unless I know it will be a success; want answers from responsible parties only; 12 years' experience; references given. Address
"GENERAL MANAGEMENT,"
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Hardware Stock For Sale.

A \$4000 stock in a fine manufacturing town with a population of about 5000. Annual sales \$35,000. Tin shop in connection, with large factory trade and telephone connections with all factories and Chicago. This is one opportunity in a lifetime. Terms cash. If you want a bargain address "M.," office of *The Iron Age*, 59 Dearborn St., Chicago, Ill.

FOR SALE.

Hardware Stock at a bargain. We offer our stock of hardware, stoves and tinware at a decided bargain, in the growing city of Ogden, Utah. Address

HORNBY & CARMAN,
Ogden, Utah.

NOTICE.

A thoroughly posted hardware man to take from \$5000 to \$20,000 stock in a company which now has \$75,000 paid up; has been established 14 years; business prosperous. Located at a capital Southern city. Prefer a man of 35 to 40 years. Must take an active interest. Splendid opening to right man. All references required. Address "SOUTHERN CITY," office of *The Iron Age*, 96-102 Reade St., N. Y.

Special Auction Notice.**HAYDOCK & BISSELL,
AUCTIONEERS.**

Tuesday, March 7th, 1893, at 10 o'clock.
At Nos. 12 Murray Street and 15
Park Place, New York.

—BY ORDER OF—

The Lalance & Grosjean Mfg. Co.
Large Special and Peremptory
Sale of

**AGATE, BLUE AND WHITE
WARE AND STAMPED
TINNED WARE,
SECONDS.**

On ninety days' time for approved paper.

The above goods will be sold in CASE and open lots and will comprise in part a full line of Agate and Blue and White Tea and Coffee Pots, Tea Kettles, Dish Pans, Lipped Sauce Pans and Pots, Convex Sauce Pans and Pots, Convex Kettles, Climax Sauce Pans and Pots, Lipped Preserving Kettles, Covered Buckets, Water Pails, Wash Basins, Coffee Boilers, Fry Pans, Spoons, Dippers, Straight Pots, &c., &c.

AT 1 O'CLOCK,

2000 First Quality Enameled
Sheet Steel Drip Pans,
Assorted, Regular Shapes.

350 Wrot-Steel Kitchen and Pantry Sinks,
Enameled, Galvanized and Painted. All
Regular Sizes.

The goods will be sold in quantities to suit the Jobbing and Retail Trade **without any reserve.**

The sale will be worthy the attention of all buyers of House-furnishing Goods, as the Ware is desirable, very salable and serviceable for general use.

Catalogues ready March 4th.

**HARDWARE STOCK
FOR SALE.**

Stock of general Hardware, Stoves, House-furnishing Goods, in first-class location, doing about \$25,000 per year. Will inventory about \$4500. Small part cash, balance easy terms.

FRANK L. GAZZOLO,
202 Milwaukee Ave., Chicago.

Collections?

All merchants and manufacturers have past due claims which need attention. We make such business a specialty. Our terms and method are right. Write us and see.

THE HARDWARE BOARD OF TRADE, Ltd.,
4 and 6 Warren street, New York.
JAS. H. GOLDEY, Treas.

CHARLES WEILAND.

I make a special business of buying and selling
Job Lots of

HARDWARE AND CUTLERY.

Tools and Second Quality Files a Specialty.
Send for Catalogue.

143 Chambers St., New York.

LAMBERSON'S

Old Reliable

HARDWARE PRICE BOOKS.

Send for new Illustrated Circular.

BUELL LAMBERSON,
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Agencies Wanted.

Having a large and centrally located store, convenient to the hardware trade of New York City, would like to secure agencies for heavy hardware, pipe, iron, &c., on salary or commission. Address

CHAS. J. STEBBINS,
103 Reade St., New York.

IF FROM ANY CAUSE

You have goods to offer at specially low figures for SPOT CASH, that you wish disposed of without danger of interference with your regular trade, address

W. M. CALDWELL,
Agent for the sale of Special Lots,
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BLOWING ENGINE FOR SALE

Vertical pattern, with balanced steam slide valve gear. steam cylinder 14 in. diameter, air cylinder 40 in. diameter, stroke 24 in. 1 to 100 strokes per minute; engine new.

JAMES LEFFEL & CO., Springfield, Ohio.

FOR SALE.

Punching and Shearing Machinery.

Hand and Belt Power.

Boiler Makers' Rolls.

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Wanted, Contracts

For building mining, blast furnace, rolling mill and factory machinery, for making castings for cable and electric railroads, or any special line of castings. Address

MAHONING FOUNDRY AND MACHINE SHOP.

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Rails, Splices and Cars. Analytical and Physical Laboratories. Examination of Iron and Steel Works and advice on Processes.

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IF YOU WANT A NIAGARA DYNAMO OR MOTOR,

or if you are a dealer and want an Agency, send for our Catalogue and Price-List.

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Undisplayed Advertisements for Help Wanted not exceeding fifty words One Dollar each insertion. Additional words two cents each.

AN EXPERIENCED retail hardware Salesman who is thoroughly posted in builders' hardware, sporting goods, cutlery and tools; a permanent position and liberal salary to right man; state age, experience and salary wanted and if now employed; references required. Address "H. D. H. & Co.," 407 Kirk Block, Syracuse, N. Y.

SALES MAN for the sale of Babbitt metal, solders, electro and stereo metals, copper, tin, antimony, spelter, in the following cities: Pittsburgh, Buffalo and surroundings, Cleveland, Detroit, St. Louis, Cincinnati, Omaha, Kansas City and New Orleans; small salary and large commission. Address "GOOD MAN," office of *The Iron Age*, 96-102 Reade street, New York.

A FIRST-CLASS Machinist, thoroughly competent to design and construct automatic machinery; the highest skill desired; references as to character and ability required. Address J. E. JACKSON, Box 32, office of *The Iron Age*, 96-102 Reade St., New York.

EXPERIENCED Salesman wanted in retail hardware store selling builders' hardware, house-furnishing goods, iron and steel, stoves and ranges, in Plainfield, N. J. Address "EXPERIENCED SALESMAN," office of *The Iron Age*, 96-102 Reade St., New York.

SALES MAN, thoroughly posted in the chemistry and metallurgy of iron and steel. Address "METALLURGY," Box 32, office of *The Iron Age*, 96-102 Reade street, New York.

A MECHANIC that thoroughly understands the making of umbrella furniture and can take full charge of the work; state experience and compensation expected. Address "C. C.," Box 32, office of *The Iron Age*, 96-102 Reade street, New York.

FOREMAN.—To take charge of a foundry that manufactures gray iron castings, both bench and light floor work; employ 40 molders; an experienced man with some capital to invest desired. THE R. E. PARSONS CO., Bridgeport, Conn.

AN ENAMELER; salary \$1500 per year; works located in a desirable section of the country; state what kinds of enameling you can do and experience you have had in the business; none but an expert need apply. Address "AN ENAMEL," office of *The Iron Age*, 96-102 Reade St., New York.

RESIDENT and traveling Salesmen, energetic and reliable men, to carry and push as a side line a patent first-class forged steel and useful mechanical tool. Address "K.," Letter Carrier 15, Buffalo, N. Y.

SALES MAN thoroughly acquainted with steam users of New England to represent Western firm manufacturing steam specialties; persistent pusher wanted; state experience and salary. Address "SREAM," office of *The Iron Age*, 96-102 Reade st., New York.

SALES MEN wanted on commission.—Manufactory, established 25 years, wants to increase its business by pushing article of easy sale to hardware trade. Address "MORGAN," office of *The Iron Age*, 96-102 Reade St., N. Y.

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Undisplayed Advertisements for Situations Wanted not exceeding fifty words Fifty Cents each insertion. Additional words one cent each.

STEEL.—By a practical man, as Superintendent or Foreman open hearth or Bessemer; understands making steel of different carbon, also dephosphorizing and analyzing same, also practical in steel molding; moderate salary first year. Address "ADVANCE STEEL," office of *The Iron Age*, 96-102 Reade St., New York.

AS MANAGER, Superintendent or Assistant in a rolling mill; would put forth all my energy for the interest of my employers; have done more work than any of my predecessors in the mill at present employed in, and the output shows an increase of one-third since I have taken charge; sober and industrious. Address "MILL MANAGER," No 32, office of *The Iron Age*, 96-102 Reade St., New York.

ROLLING MILL Machinist desires a change as a Mechanical Engineer or mill machinist of rolling mills; has been mill machinist of rolling mills for the last 20 years, of steel mills and iron mills; am a man of 48 years of age, of 30 years' practical experience of handling machinery, managing of men; can furnish the best of reference as to mechanical ability and character. Address "ROLLING MILL MACHINIST," office of *The Iron Age*, 96-102 Reade St., New York.

BY A YOUNG MAN, a position in a hardware store, having had eight years' experience, also understands double-entry book keeping thoroughly; am at present employed, but would like to change for better salary; can furnish best of references. Address "C. S. L.," Box 32, office of *The Iron Age*, 96-102 Reade St., New York.

A YOUNG MAN with ten years' experience in shelf and heavy hardware, carriage and blacksmiths' supplies, is open for engagement about April 1st as Salesman or Stockkeeper; salary not so much as an object as advancement; can furnish best of references and give security if required. Address "PUSHER," Box 126, Guelph, Ontario.

HARDWARE MAN, age 38, proprietor 14 years retail store, wants position; thorough knowledge of general and builders' hardware; good manager, cashier, bookkeeper. &c.; references A1. Address, with information as to position, &c., "WELL POSTED," office of *The Iron Age*, 96-102 Reade St., New York.

AS SUPERINTENDENT of iron or steel mill by a thorough practical mill superintendent; am especially adapted for position as builder of mills, having built four or five, and can furnish best of references from former employers; will go to any part of America or Mexico. Address "BUILDER," office of *The Iron Age*, 96-102 Reade St., New York.

AFTER APRIL 1, by a man 38 years old, to take charge of machinery in mill or factory; practical machinist; best of references; position must be permanent; or would go to machinery business with reliable party. Address "MILL OR FACTORY," office of *The Iron Age*, 96-102 Reade St., New York.

A POSITION as Traveling Salesman in hardware specialties by a young man who has had four years' experience and can furnish A1 reference. Address "D. W. W.," No. 32, office of *The Iron Age*, 96-102 Reade St., New York.

AS ROLLER for hoop, bar or guide iron; well posted on all kinds of fancy work; can give good references. Apply to "T. W. T.," 55 Mont Morenci St., Pt. St. Charles, Montreal.

THE FOREMANSHIP of a gray iron foundry by a thoroughly competent man; 18 years at the business, five as foreman; am accustomed to heavy and light work in loam, dry and green sand, handling men, mixing iron, melting economically with coke or coal; temperate in habits; refer to former employers. Address "LOAM," office of *The Iron Age*, 96-102 Reade St., New York.

A POSITION as Assistant Superintendent or shipping clerk, by an energetic young man; having had 16 years' experience in rolling mill, has a practical knowledge for the manufacture of best kinds of iron; can furnish first-class references as to ability, character, &c.; strictly temperate in habits and well used to handling men. Address "G. J.," office of *The Iron Age*, 220 South 4th St., Philadelphia.

RETAIL HARDWARE Salesman with nine years' experience, good references from present employers and others as to integrity, good habits and ability, open for engagement, now or first of April. Address JOHN M. LIMBERGER, 215 Cumberland St., Harrisburg, Pa.

AS SUPERINTENDENT; or a good sized contract; having had over 15 years' practical experience in manufacturing of small hardware and novelties, am well acquainted with getting out patterns, dies, special tools, and with getting out work to a good advantage in the following departments: iron and brass foundry, polishing, plating, drilling, jannanning, punching, &c., &c.; can give best of references. Address "SUPERINTENDENT," office of *The Iron Age*, 220 South 4th St., Philadelphia.

BY AN EXPERIENCED Roll Turner in angles, tees, channel beams and for shapes generally, a situation; good references. Address "ROLL TURNER," No. 223, office of *The Iron Age*, 96-102 Reade St., New York.

A POSITION as superintendent or assistant superintendent of blast furnace, by a young man now in charge of a plant, who is a practical chemist and furnaceman; would like to go to South America or the Southern States; first-class reference from present employer. Address "DOLLY," office of *The Iron Age*, 96-102 Reade St., New York.

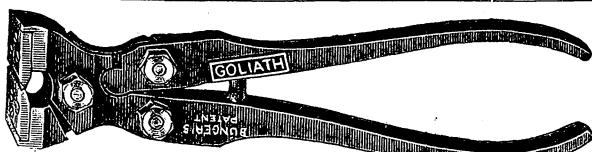
BY A ROD ROLLER of 15 years' experience, part of the time in Germany and ten years in this country; strictly sober and reliable and can show a good recommendation. Address "ROD ROLLER," office of *The Iron Age*, 96-102 Reade St., New York.

MILL SUPERINTENDENT; an energetic man, age 33, having 12 years' practical experience, Eastern and Western Pennsylvania, as Mill Superintendent and assistant in steel forging and rolling, besides a good sound knowledge of business and ability to organize and handle men, desires a position; first-class references; is now with a Steel Co. in Pittsburgh. Address "MILL SUPT.," office of *The Iron Age*, 96-102 Reade St., New York.

DESIGNER and Draftsman with experience in machine tools and hoisting machinery wants position; has had shop experience and is graduate from one of leading engineering colleges. Address "D. AND D.," office of *The Iron Age*, 96-102 Reade St., New York.

PLATE AND SHEET MILL Manager of many years' experience desires an engagement; can furnish the best of references. Address "PLATE MILL," office of *The Iron Age*, Rooms 22-24 Pickering Building, Cincinnati, O.

BLAST FURNACE Superintendent, who has had long experience with different ores and fuels and can come well recommended, desires a position; is well posted in modern practice and practically familiar with all details of manufacture and management. Address "ORES AND FUELS," office of *The Iron Age*, 96-102 Reade St., New York.



The United States Patents covering the Goliath Tools are offered for sale, or proposition for their manufacture on royalty will be given consideration.

Powerful Nippers for cutting iron wire up to 5-16 inch and copper wire up to 3-8 inch.

Tinner's Snips for cutting sheet iron.

Also Powerful Tinner's Snips with very long blades for light tin.

Also Pruning and other Shears with Drawing Cut, and Hedge Shears.

They are constructed on new and improved principles and are superior in many respects to any others on the market.

Further particulars can be obtained by addressing

"GOLIATH," care The Iron Age, 96-102 Reade St., New York

FOR NUMBERING AND LABELING
Boxes, Drawers and Shelves,
In Hardware Stores and Factories.

Send for sample and description of our Handy Box of small gummed Letters and Figures, intended for labeling shelf boxes. Put up especially for the Hardware trade.

THE TABLET AND TICKET CO., Mfrs.,
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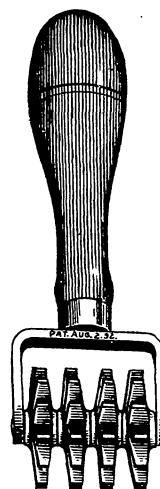
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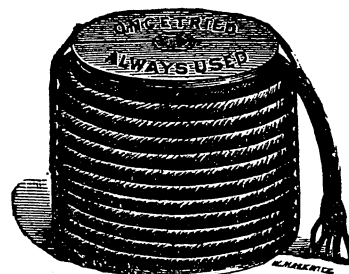


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501.46.10	1504.38.31	2507.30.52	3510.22.73	4513.14.93	5516.07.14	6518.99	7521.91	8524.83.76	9527.75.97
601.75.32	1604.67.53	2607.59.74	3610.51.95	4613.44.15	5616.36.36	6619.28	7622.20	8625.12.99	9628.05.19
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802.33.77	1805.25.97	2808.18.18	3811.10.39	4814.02.60	5816.94.80	6819.86	7822.78	8825.70.43	9828.63.63
902.62.99	1905.55.19	2908.47.40	3911.39.61	4914.31.82	5917.24.02	6920.16	7923.08	8926.00.65	9928.92.85
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601.70.83	1604.55.54	2607.40.26	3610.24.97	4613.11.68	5615.96.39	6618.81.10	7621.65.81	8624.50.52	9627.35.26
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902.56.24	1905.40.96	2908.25.67	3911.10.39	4913.97.81	5916.82.52	6919.67.23	7922.51.94	8925.36.65	9928.21.39
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401.11.61	1403.90.63	2406.69.65	3409.57.03	4412.43.74	5415.28.45	6418.13.16	7421.07.87	8423.92.58	9426.77.32
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701.95.31	1704.74.34	2707.53.36	3710.40.97	4713.30.39	5716.15.10	6718.99.81	7721.94.52	8724.79.23	9727.63.97
802.23.22	1805.02.24	2807.81.26	3810.68.92	4813.59.10	5816.43.81	6819.28.52	7822.13.23	8825.02.94	9827.92.68
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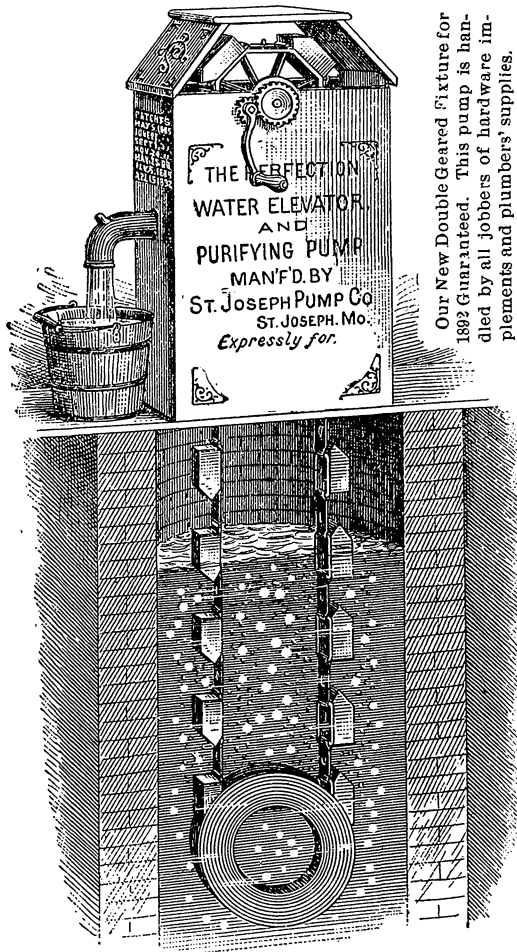
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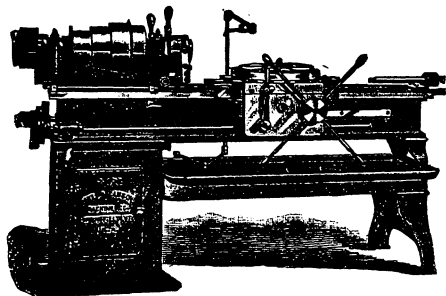
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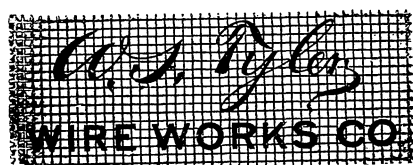
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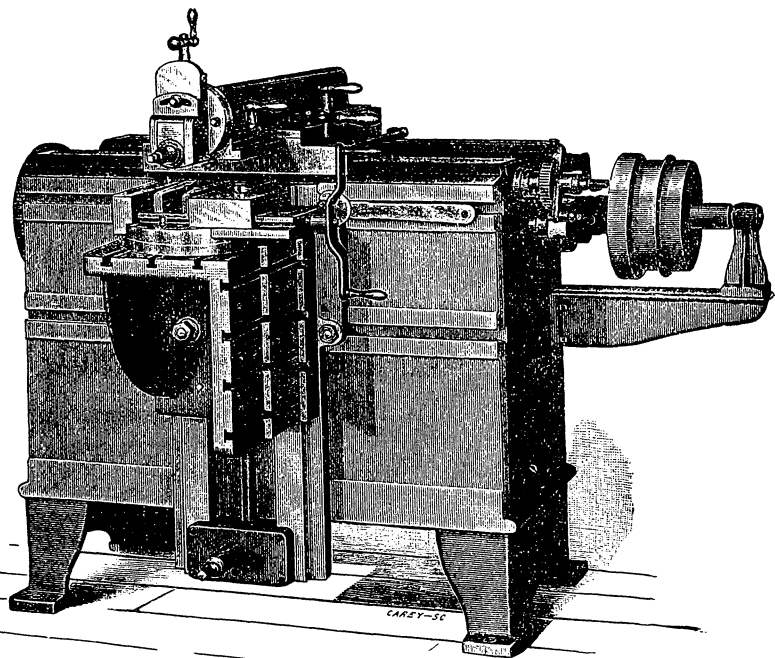
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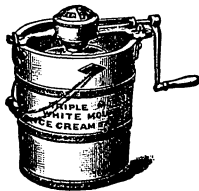
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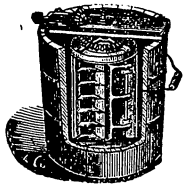
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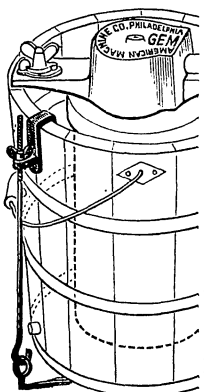
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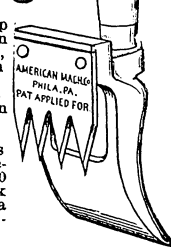
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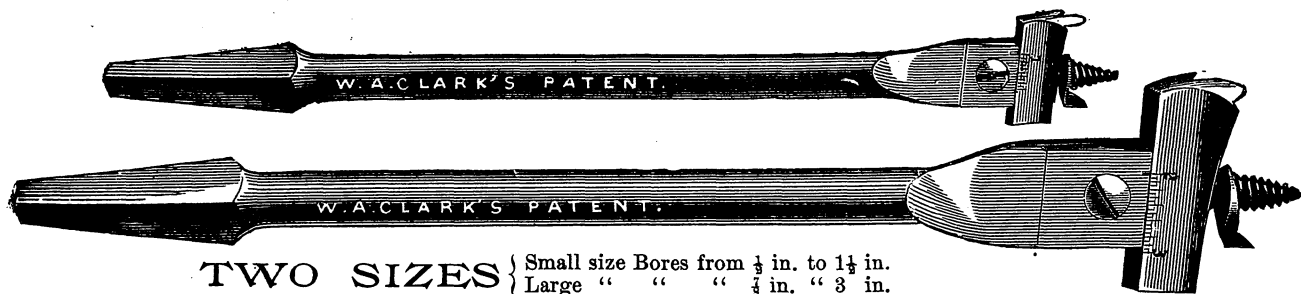
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Large " " " $\frac{3}{4}$ in. " 3 in.

SPECIAL CUTTERS: No. 5—For Large Bit, Bores from 3 in. to 4 in. No. 6—For Large Bit, Bores from 4 in. to 5 in.

Stock and workmanship superior to all others. Every part interchangeable.

Quality guaranteed. For sale by all Hardware Dealers.

Manufactured by **R. H. BROWN & CO.,** New Haven Conn.

*You take no risk on the quality.
We make only the best!*



**Sand
Papers**

IN
Reams and Rolls

Flint Paper
Garnet Paper
Emery Paper
Emery Cloth

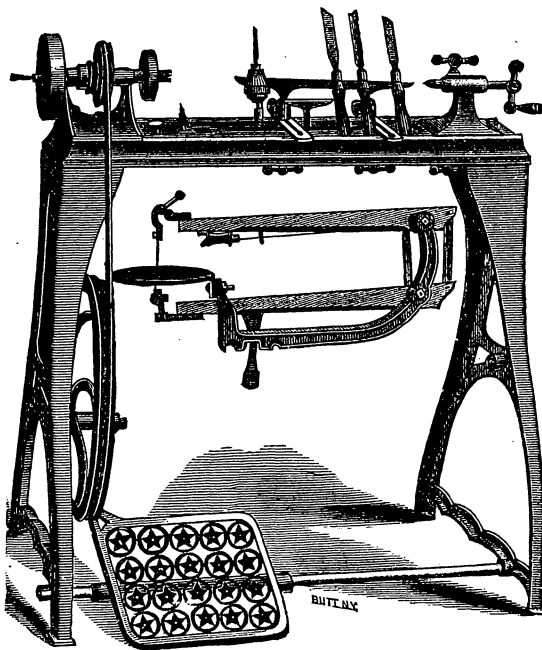
HAIR FELTING for covering Boilers, Steam and Water Pipe, and lining Refrigerators.

BAEDER, ADAMSON & Co.

730 MARKET STREET, PHILADELPHIA.
67 BECKMAN STREET, NEW YORK.
143 MILK STREET, BOSTON.
162 LAKE STREET, CHICAGO.

GOODSELL LATHE.

Holiday Trade, Get Ready for It.



Many kinds of Scroll Saws have been put on the market by ourselves and other manufacturers during the past twelve years. Of these only a few have proved good enough to remain in demand. The call now is for a well-made, practical machine, and all second-class ones are of slow sale.

Those who want a good Lathe with Scroll-Sawing Attachment and all Tools and Improvements to the very latest moment will buy the Goodsell Lathe.

Those who want only a Scroll Saw with Drilling Attachment, Rubber Blower and Lever Clamp will prefer the Rogers Saw.

These two machines are taking the place of all others, and are now the most in demand throughout the world.

No dealer can make a mistake by laying in a stock of them. About Christmas time they are wanted in every town, and will make business lively at this otherwise dull season.

We also keep a full stock of Designs, Wood, and all other Scroll Sawing goods.

Price of Goodsell Lathe, complete, \$12.00.

Price of Rogers Saw, complete, \$3.50.

MILLERS FALLS CO.,

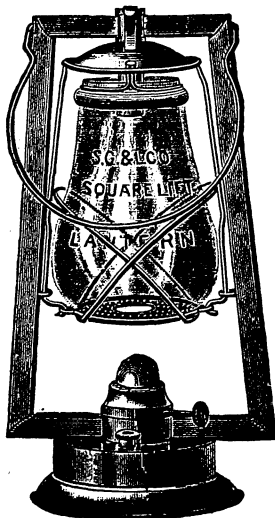
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Specialties
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Cash and
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Boxes.
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Boxes.

Office and House Boxes for Mail Delivery.
House Furnishing Japanned Ware (High Grade).

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Square Lift Wire Lan-
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Steam Gauge AND Lantern Co.

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Western Branch: 25 Lake St., Chicago, Ill.

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Standard Tubular Lamps and Lanterns.

THE BEST IN THE WORLD.

Tubular Lanterns,

Tubular Street Lamps,

Tubular Hanging Lamps,

Tubular Station Lamps,

Tubular Driving Lamps, etc.

THE YALE & TOWNE MFG. COMPANY,

OWNING AND OPERATING

THE YALE LOCK MFG. COMPANY.

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Lessee, Branford Lock Works.

OFFICE AND WORKS, STAMFORD, CONN.

Ornamental Metal Work, Locks and Builders' Hardware for every purpose.

Catalogues and full information furnished on application at any of our houses.

NEW YORK. CHICAGO. PHILADELPHIA. BOSTON.
84-86 Chambers Street. 152-154 Wabash Ave. 1120 Market St. 224 Franklin Street.

THE DEALER who sells what
THE PEOPLE ask for

MAKES FRIENDS and MONEY, and
SAVES TIME and TROUBLE.

The people ask for

**LePage's
Liquid
Glue,** And the people are right.

It is the strongest and best glue made. It has been imitated, but never equalled. Be sure to get what you order and ACCEPT NO SUBSTITUTES.

Our name is on every label

RUSSIA CEMENT CO.,

GLOUCESTER, MASS.

New York Office, 95 Reade and 113 Chambers Streets.

Pacific Coast Office, 23 Davis Street, San Francisco, Cal.

'STEEL' RULES, HARDENED ENDS.

Also a full line of

MACHINISTS' FINE TOOLS.

If you haven't our 1893 catalog send us a postal card.

STANDARD TOOL CO.,

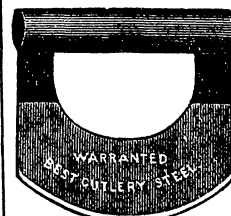
ATHOL, MASS., U. S. A.

ATHOL MACHINE CO., Selling Agents.

IT PAYS. Nothing about a Hardware Store looks so well as clean shelves and the goods neatly boxed with a fresh sample on the front. Customers are attracted by such a display of care, and notice and buy things that would ordinarily go without notice. The Boxes are inexpensive, save the goods, make a big show for a small investment and help the salesmen. Send to

JESSE JONES & CO., Philadelphia for Catalogue of prices, styles and references.

**THE GEM,
SOLID STEEL MINCER**



Single
and
Double Blades.

Handle and Blade Formed in one piece. Always Clean. Indestructible.

No Rivets to Wear Loose.

No Wooden Handle to Shrink, Swell, Loosen, Split, or Fill with Rancid Grease.

MANUFACTURED BY
PALMER HARDWARE MFG. CO.,
TROY, N. Y.

ELIZABETHPORT CORDAGE CO.

Manufacturers of

ROPE AND BINDER TWINE,

46 South Street, New York.

W. & B. DOUGLAS, MIDDLETOWN, CONN.

Branch Warehouses: 85 and 87 John St., New York; 197 Lake Street, Chicago, Ill.

THE OLDEST AND MOST EXTENSIVE MANUFACTURERS OF

Pumps, Hydraulic Rams, Garden Engines,

Yard Hydrants, Street Washers, Galvanized Pump Chain, Wind Mill Pumps and other Hydraulic Machines in the World.

DOUGLAS' DIAPHRAGM PUMPS, "Loud Patent."

A LARGE CAPACITY, AND EASY WORKING PUMP FOR

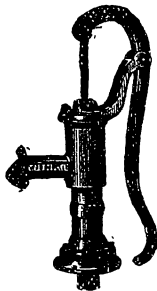
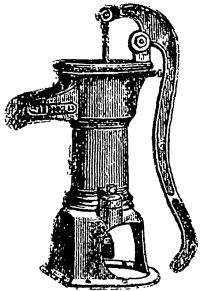
Water Works, Sewer Contractors, Foundation Builders, Mines, Quarries,

Fig. 120.

Fig. 70.

Fig. 209.

Fig. 381



or wherever it is desired to raise a large quantity of water by hand power.

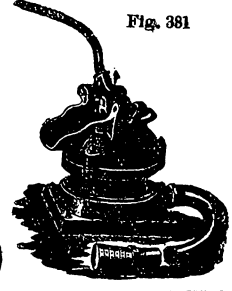
The pump has large valves (accessible by hand) and will pump water containing sand, gravel, sewage matter, &c., without choking or any perceptible wear.

Capacity from 3,000 to 4,500 gallons per hour.

These pumps are simple, durable and low priced.

Made either as shown in cut for Hose or for IRON Pipe Suction underneath.

Send for Circular and Price List.



THE DEMING
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MANUFACTURERS OF
ARTESIAN WELL
CYLINDERS
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HAND & POWER
PUMPS,
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SUPPLIES
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VERTICAL STEAM PUMPING
ENGINES
N.Y. OFFICE
72 JOHN ST.
HENTON & HUBBELL
GEN'L. WESTERN AGTS.
55 & 57, N. CLINTON ST.
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WORLD'S FAIR

FORCES LIFT PUMPS

ASHLAND, O.

THE LARGEST PUMP & HAY TOOL WORKS EXCLUSIVELY IN THE UNITED STATES.

MYERS

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† CATALOGUES FREE †

ASHLAND PUMP & HAY TOOL WORKS

A NEW CHAIN PUMP

KENNER'S PATENT
Galvanized Iron Tubing
FOR CHAIN PUMP.
Is guaranteed to be
THE BEST.

IT is made of best quality Galvanized Iron, which will not rust nor accumulate filth.

IT only weighs one-half pound to the foot, wet or dry, while wood tubing saturated with water weighs six pounds or more per foot.

IT will last longer than wood tubing.

IT will not freeze in any climate.

IT can be attached to any make of curb.

We also manufacture a Galvanized (all) Iron Curb. Address

BELLEVUE PUMP CO.,
Sole Mfrs., BELLEVUE, IOWA.

OR **A. F. SHAPLEIGH HDW. CO.,** St. Louis.
Agents for Southern Territory.

SHIPPERS
CAN SAVE TIME
AND TROUBLE
AND CASH

BY USING
BARLOW'S
PATENT
MANIFOLD
SHIPPING
BLANKS. SEND FOR
SAMPLE SHEET & PRICES.

BARLOW BROS. GRAND RAPIDS, MICH.



WORTHLEY'S "SLOW FEED" MANGER.

"A Great Teacher." "A Good Scheme." "A New Idea."

The seven one-pint cells prevent waste and bolting. Used by Boston Veterinary Hospital and 5000 others. 17 inch, 25 lb. size, price, \$1.60.

They nest together easily. Freight Rates are extra low. Shipped from New York, New Haven or Boston f.o.b. Discounts Liberal. Send for Catalogue of Hay Racks, Guards, &c.

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STRONGEST.

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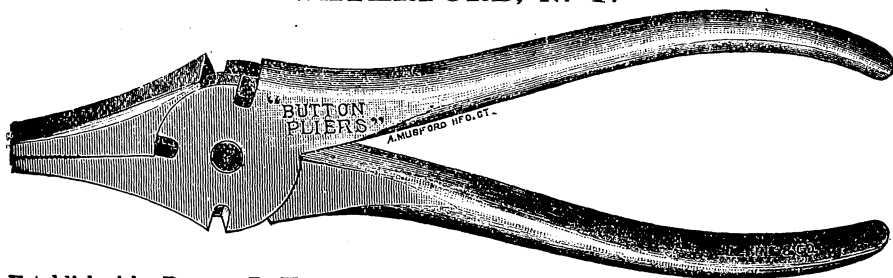
WARNER'S BURGLAR PROOF LOCKS.

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J. M. KING & CO.,
WATERFORD, N. Y.

Manufacturers of
BUTTON'S



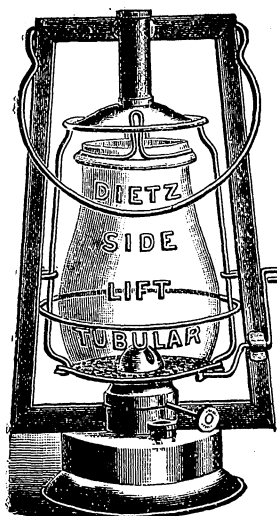
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AND PLIER COMBINED.**

Specialty Adapted for Use on Wire Fence.

Also Manufacturers of BLACKSMITHS' and
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TAPER TAPS, HAND, NUT and SCREW
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Price-List on Application.

Established by DANIEL B. KING, 1829.



ESTABLISHED 1840.

A WORD TO THE WISE IS SUFFICIENT.

When you purchase a Lantern, Street Lamp
or Driving Lamp, remember the

"DIETZ" Make

is the best. Our goods have stood the test
of time and are safe and reliable. The name
"DIETZ" is plainly stamped on them. Our
specialty is Tubular Lanterns, Street Lamps
and Driving Lamps. We make a large variety
being the oldest and largest house in our line

ASK FOR THEM!

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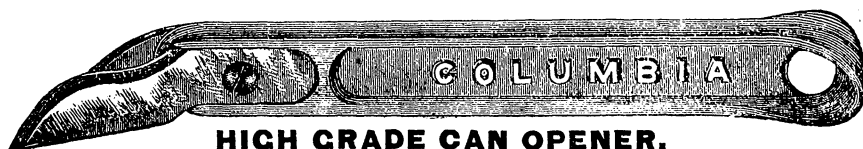
New York, 60 Laight St. U. S. A. Chicago, 25 Lake St.

SELLS AT SIGHT.



**Wanted by
Every Housekeeper.
Cottner's Pat. Dipper and Cup Handle.**

Is the handiest thing out. With it a dipper can be made of a common glass, a
tea cup, or a granite ware cup. The glass or cup can be securely attached to
the handle or removed in a moment. The handle is very durable, and so
cheap that they will sell at sight. For sale by all jobbers. Price \$7.20 per
gross. If your jobber cannot supply you, send orders direct to
HOME NOVELTY MFG. CO., St. Louis, Mo.
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HIGH GRADE CAN OPENER.

A. F. Meisselbach & Bro., Mfrs., Newark, N. J.

— ALL JOBBERS. —

BUSINESS ESTABLISHED
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INCORPORATED
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JOS. F. McCOY CO.,

26 Warren St., New York,

—Importers and Dealers in—

HARDWARE, CUTLERY, TOOLS

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RAILWAY SPECIALTIES.

SOLE AGENTS FOR

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**'CONROY'
Refrigerator Door**

Fasteners

Have rapidly supplanted all
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Refrigerator Trimmings.



Pat. Dec. 15 85.

E. C. ATKINS & CO., Indianapolis, Indiana.

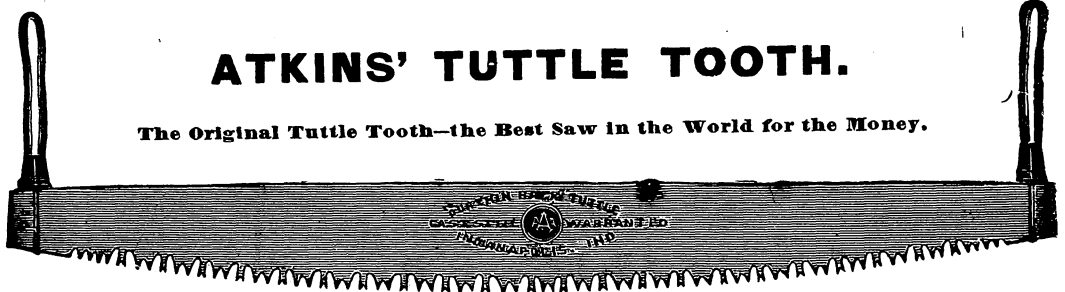
We make a Specialty of Fine High-Grade Saws.



Atkins' Tuttle Tooth One-Man Saw.

BRANCH HOUSES:

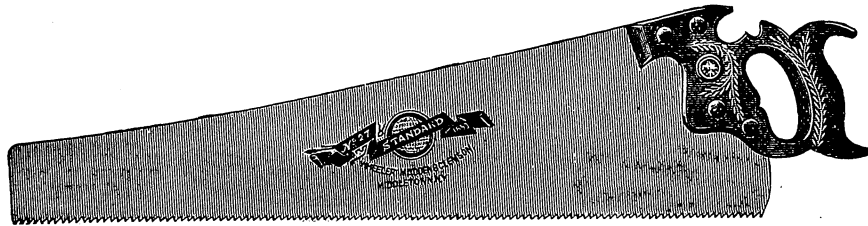
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Chattanooga, Tenn.
Minneapolis, Minn.



ATKINS' TUTTLE TOOTH.

The Original Tuttle Tooth—the Best Saw in the World for the Money.

THE NATIONAL SAW CO., 96 & 98 Reade St., New York.



The latest improved high class Hand Saw. It has hollow back blade, close up apple handle carved, ground thin back, patent temper and high finish, without a question the leader among first quality mechanics' saws. We warrant it fully. Packed 1-3 doz. assorted points in pasteboard boxes with telescope cover. We manufacture all styles, kinds and variety of Hand Saws, and solicit inquiries.

Three Essentials

IN THE MODERN CROSS-CUT SAW.

- 1.—Teeth of uniform thickness.
- 2.—Five Gauges taper in middle of blade.
- 3.—Three Gauges heavier on ends than in center of back.

For 10 YEARS the Simonds Crescent-ground Cross-cut Saw (the only Saw on the market possessing these **ESSENTIALS**) has stood out prominently in contrast with all other makes of cross-cut saws. It has been the **CRESCENT-GROUND** against the **FIELD-MODERN IDEAS** against **ANCIENT METHODS**.

TO-DAY the Crescent-ground Saw is in use in every important lumber camp in the United States. Manufacturers have endeavored to imitate it, but the Machinery producing the Saw, the Process by which it is produced, and **THE SAW**, are patented. All imitations are but involuntary acknowledgments of the **SUPERIORITY** of

THE CRESCENT-GROUND CROSS-CUT SAW.

(PATENTED DEC. 26, 1882.)

SIMONDS MFG. CO.,

SIMONDS SAW CO.,

FITCHBURG, MASS.

CHICAGO, ILL.

SAN FRANCISCO, CAL.

PORTLAND, ORE.

NEW ADJUSTABLE BENCH LEVEL.

WITH GROUND AND GRADUATED VIAL.

4-6 and 8 inch.

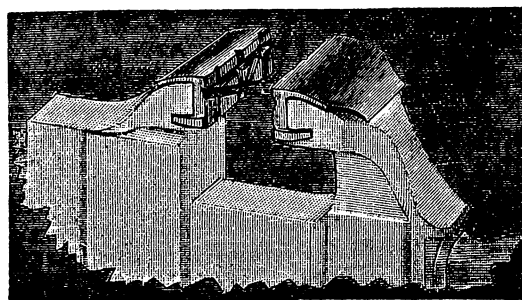


Three Sizes.

MANUFACTURED BY

C. F. RICHARDSON & SON,

ATHOL, MASS.



BINGHAM

PATENT VISE JAW CAP

Will Fit any Kind of Vise.

For protecting finished work. Will hold finished rods of any shape without injury.

3 1/4 inch, per pair, 40 cents.
4 " " " 60 "
4 1/4 " " " 60 "

PRENTISS VISE CO.

44 Barclay St., New York.

"If you want a Saw It is best to get one with a name on it which has a reputation.
A man who has made a reputation for his goods knows its value as well as its cost and will maintain it."—HENRY DISSTON.

THE SAWS THAT LEAD THEM ALL

DISSTON & SONS' PATENT D-8 HAND SAW.

"THE
SAW,"
HOW
TO
CHOOSE

IT,
AND
HOW
TO
KEEP
IN
ORDER,

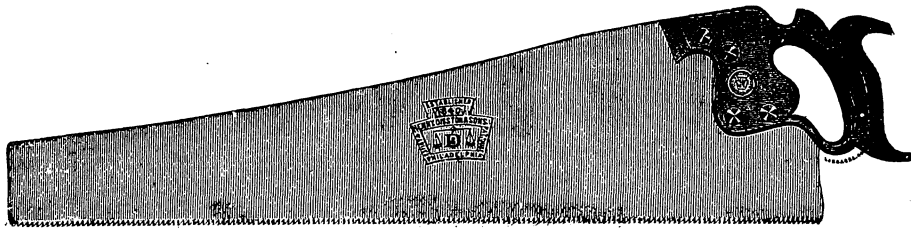
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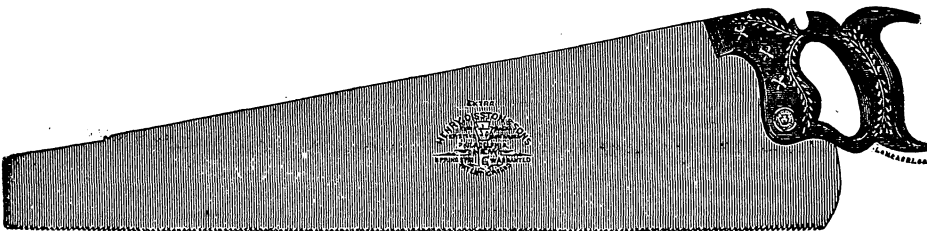
Address.



This Saw combines all the valuable improvements in Hand Saws that have been made by us of late. The first and most important is the hollow or skew back, the success of which can best be attested by the number sold. The peculiar shape of the butt or heel, coupled with the new method of fastening to the handle, give a full stroke of the blade without fear of catching or hooking in the work; and as the handle is put further on the blade you have a full stop on the proper point and a greater command over your Saw, by reason of being two inches nearer the point, which must give more power.

The Saw being let into the handle on a circle, has a perfect bearing, which, with the new screws, makes it stronger and almost impossible to work loose, and avoids the unsightly gap that is seen on the back of the old style handle. All the above features are patented.

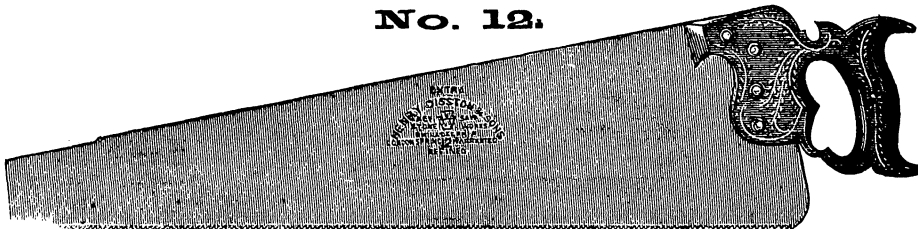
Our New No. 16 Premium Saw.



AN EXTRA FINE SAW IN EVERY RESPECT.

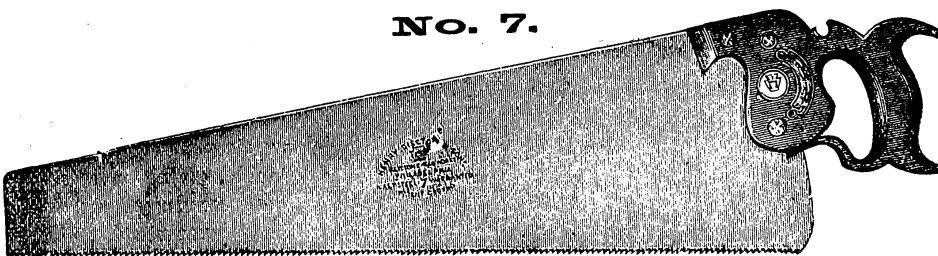
Having the Latest Close up Handle, Spring Steel Blade, Extra Thin Back, Finely Grained, with an Apple Handle and Four Brass Centennial Screws.

No. 12.



DISSTON & SONS' Extra Refined London Spring Steel, Selected and highly Polished Blade, Handle Carved and Polished, 4 Improved Brass Screws, the finest Hand Saw manufactured.

No. 7.



DISSTON & SONS' Cast-Steel, Warranted, Beech Handle, Polished Edge, 4 Improved Screws, Grained Blade.

"POCKET
EDITION
OF
THE
SAWYER "

and
"LUMBER-
MAN'S
HAND
BOOK,"

Sent
Free
on
Receipt

of
Name

and

Post Office

Address.

ASK YOUR DEALER TO ORDER THEM FOR YOU.

HENRY DISSTON & SONS

(INCORPORATED),

Keystone Saw. Tool, Steel and File Works, Philadelphia, Pa.

FACTORIES AT
AKRON, - OHIO.
CANTON, - OHIO.

The Whitman & Barnes Mfg. Co.

FACTORIES AT
SYRACUSE, - N. Y.
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—MANUFACTURERS OF—

Spring Keys. Spring Cutters. Flat Spring Keys. Flat Riveted Keys. Cellar Box Cutters.

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CHICAGO ILL.
1324 West 11th Street,
KANSAS CITY, MO.
126 Main Street,
CINCINNATI OHIO.

BRANCHES AT
32 So. Market Street,
BOSTON, MASS.
1917 Market Street,
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33 Market Street,
SAN FRANCISCO, CAL.

NEW YORK OFFICE, 102 CHAMBERS ST.

NICHOLSON FILE CO.
PROVIDENCE, R. I.

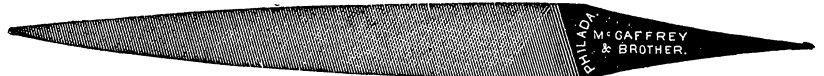
THE LARGEST AND MOST COMPLETE FILE WORKS IN THE WORLD.

3000 VARIETIES FILES [X.F.] AND INCREMENT CUT FILES.

Philadelphia, 1876.

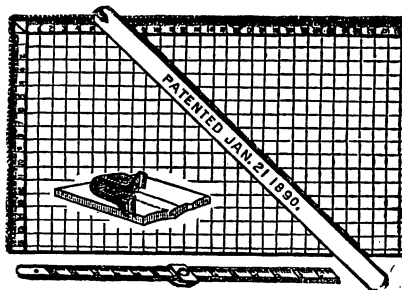
McCAFFREY FILE CO.,FIFTH and BERKS STS.,
PHILADELPHIA, PA.

For Superiority



Manufacture and keep in stock a full line of FILES and RASPS only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.

**The Canton Glass Board.**

Cuts any Fraction of an inch by Eighths.

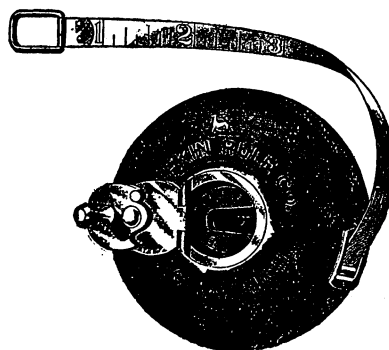
Unequaled for accuracy and quick work in cutting square or at any angle. Saves breakages, &c.

—ALSO—

IMPROVED TRAMMEL RULE for Cutting Circles
From 3 inches up to 48 inches, Segments, Gothic Shapes, &c.

Send for Circular.

The Canton Saw Co., Canton, Ohio.

**"RELIABLE"
Steel Measuring Tapes.**

Entirely new. Handle or crank when closed is perfectly flush with leather case. Opens by pressing button on opposite side and folds out double, giving increased leverage. Best and most convenient steel tape on the market. Fully guaranteed. Will send samples on approval.

LUFKIN RULE CO., Saginaw, Mich.

WM. KROGSrud,
Engraver and Die Sinker.
61 Fulton St., N. Y.,
Manufacturer of
STEEL STAMPS
For Every Purpose.
Steel Letters & Figures.
Burning Brands, Stencils,
&c. Send for Illustrated
Catalogue.

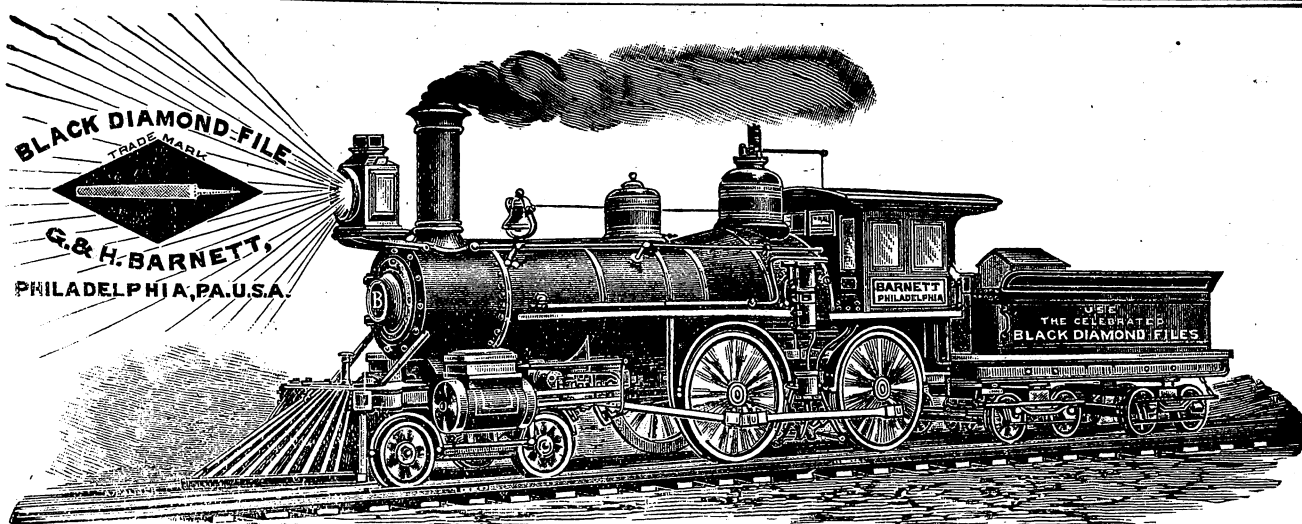
HORACE E. BRITTON, Stoughton, Mass., Manufacturer of the **HENRY'S PATENT COMBINATION HAFT,**



AND OTHER TOOL SPECIALTIES.

The Combination Haft contains six Brad-Awls, one Chisel, Screw Driver, Diamond Point Awl, Marking Awl, Tack Puller and Reamer. Send for Circular and Prices.

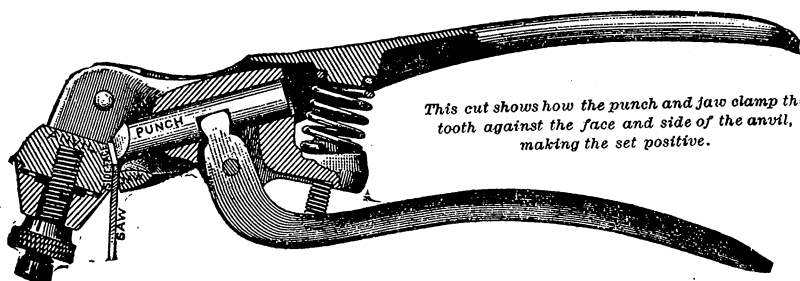
Full Set Sent Post-paid on receipt of \$1.00. (No stamps.)



BUY A SAW SET YOU CAN MAKE MONEY ON!!!! THE LLOYD ACME HAND AND CROSS CUT.

Wm. J. Lloyd Manufacturing Company, - Philadelphia, Pa.

THE TAINTOR POSITIVE SAW SET.



This cut shows how the punch and jaw clamp the tooth against the face and side of the anvil, making the set positive.

Mechanics are now inquiring for this tool, and Hardware Dealers should have them in stock, or at least have a sample.

BOSTON, Oct. 27, 1892.
TAINTOR MFG. CO., New York,
DEAR SIR:—Have tried your Saw Set, and find it the best in every particular and have used a great many different kinds for twenty years.
Yours, etc., F. W. SPEARMAN, No. 75 Rutland St., Boston.

For Prices and Discounts, address

WIEBUSCH & HILGER, Ltd., Sole Agents,
84 and 86 Chambers Street, New York.

SOLE MANUFACTURERS OF
Backus Patent Bit Braces,
RATCHET BRACES, ANGULAR BORERS,
Adjustable Socket Wrenches and Breast Drills.
Write for 1892 Catalogue and Price List.

BACKUS MANUFACTURING CO.
WILLIAMSPORT, PA.



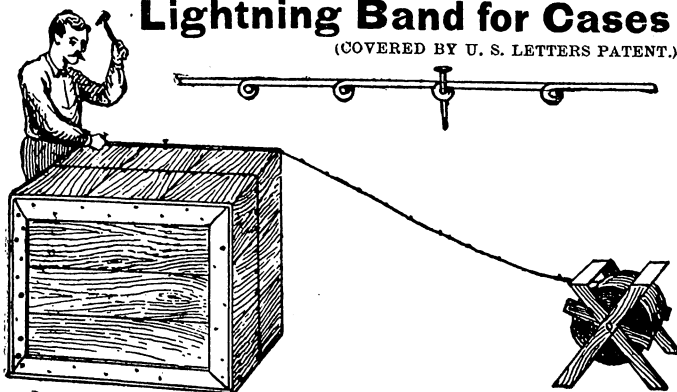
Angular Borer.



Adjustable Socket Wrench.

Lightning Band for Cases and Crates.

(COVERED BY U. S. LETTERS PATENT.)

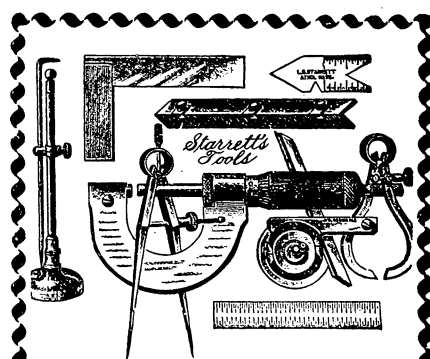


Mounted on reels and always ready for use and convenient to handle. Easily and quickly binds shipping cases and crates in a neat, strong and substantial manner.

PRICES:

No. 1, per reel of 2000 ft., \$4.50 net.
No. 2, per reel of 2000 ft., \$4.75 net.
Pliers for cutting wire, 50 cents extra.
No. 1 for cases under 300 or 400 pounds, and No. 2 for all heavier cases.

Buffalo Specialty Mfg. Co.
Sole Manufacturers,
Buffalo, N. Y. U. S. A.



Skilled Mechanics

want tools that are warranted accurate, best in workmanship, latest in design, finest in finish.

Live Dealers

want tools they can swear by, not at. That can be relied upon to satisfy intelligent customers. That come nicely put up. That pay a good profit.

Starrett's Tools

meet the requirements of both.

SEND FOR CATALOGUE.

L. S. STARRETT

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The Practical Polish and Varnish Maker.
By H. C. STANDAGE. A treatise containing 750 receipts and formulae for the manufacture of varnishes, polishes, &c. 12mo, cloth, \$2.50.
For Sale by David Williams 96-102 Reade St., N. Y.

J. R. TORREY RAZOR CO.,

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Our Razors have become the standard for excellence and are no higher in price than the foreign. We manufacture and carry in stock more than 200 styles. Send for illustrated catalogue.

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BUCK BROTHERS,

MILLBURY, MASS.

The Most Complete Assortment in the U. S. of

Shank, Socket Firmer and Socket Framing
Chisels.

PLANE IRONS.



TRADE MARK

CAUTION.—Buyers should be on their guard and not have inferior goods palmed on them by unprincipled persons who represent them as our make. Our tools are stamped "BUCK BROTHERS," and our labels have on our trade-mark also, "Riverlin Works."

Established 1825.

Incorporated 1892.

R. HEINISCH'S SONS CO.,

NEWARK, N. J., U. S. A.

New York office, No. 90 Chambers St.

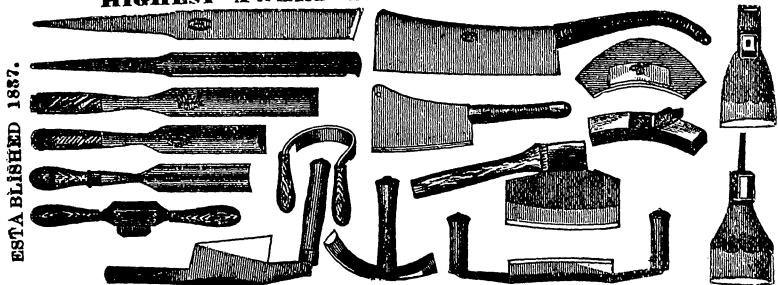
Tailors' Shears, Trimmers, Scissors, Tinnors' Snips, etc.



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Our contract with Messrs. H. Boker & Co. as sole agents for the sale of our goods expired May 1st, 1892.

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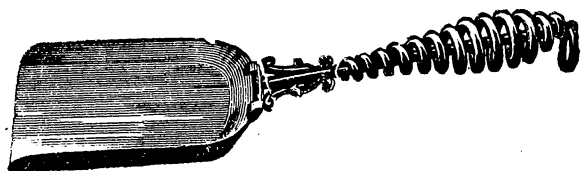


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Pokers Lifters, Shovels and Fire Sets. For sale by all First-Class Jobbers in Hardware.

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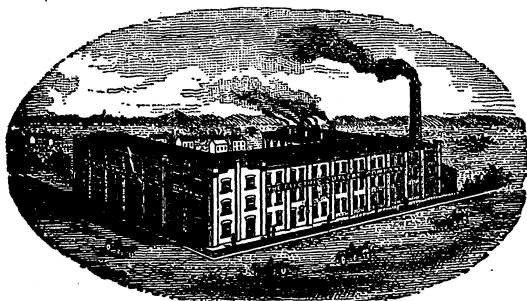
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Manufacturers of Razors, Knives,
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WE CALL ESPECIAL ATTENTION TO OUR COMPLETE LINE OF FINE GOODS IN RUBBER,
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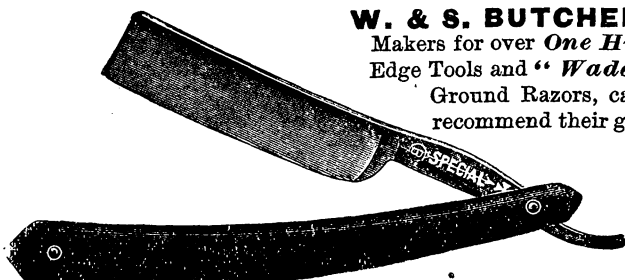
— OUR CLAIMS ARE: —

EXTRA QUALITY OF STEEL IN BLADES.

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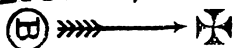
STRENGTH AND DURABILITY.

Made in Plain Steel or Heavily Plated Blades, Hand Burnished.



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ACME CUTTING TOOLS.

Made in all Sizes.

SOLID STEEL ACME PLIER
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Made with cutters of best steel.

strong as solid steel.

Jaws of choicest Tool Steel, dove-
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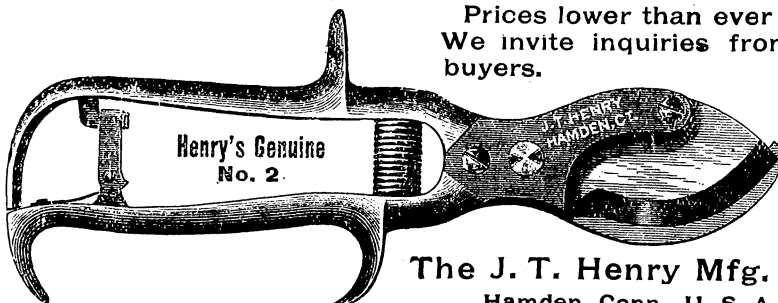
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THIS improvement
permits CORRECT
SHAVING, therefore no
irritation is caused, and
the most inexperienced
can shave with perfect
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We also carry the largest line in the United States of
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Prices lower than ever before
We invite inquiries from large
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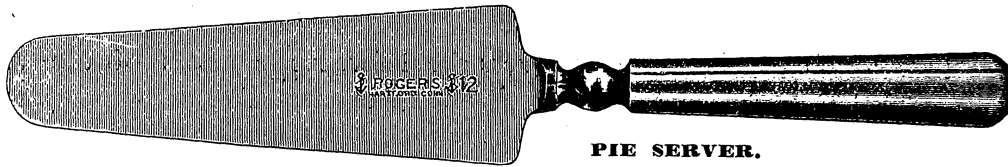
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PIE SERVER.

MANUFACTURED BY

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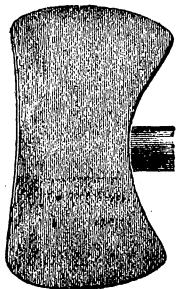
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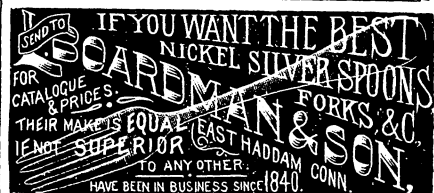


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DOUBLE BIT AXES. CARPENTERS' ADZES,
SINGLE BIT AXES. MINING PICKS,
BROAD-AXES. MACHINE KNIVES,
HAND-AXES. BARK SPUDS.

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STANDARD AXE & TOOL WORKS,
RIDGWAY, PA., U. S. A.

WILLIAMSON'S
Power Cork Screws.

Turns the Cork out of the bottle.

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No. 19. Tinned.....	\$1.50 per dozen.
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For Discounts and other Styles send for Catalogue.

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—Manufacturers of Wire Specialties for the Trade.—

THIS IS THE "OLD RELIABLE" DOUBLE ACTION
RATCHET SCREW DRIVER

One of the Very Best Tools Ever Invented.

It Combines greater Strength, Convenience and Durability than was ever obtained in a Common Driver

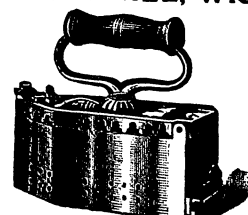
Gives Perfect
Satisfaction.
Sells Readily.

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Sold by all First-Class Dealers. Send for Price List.

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Manufacturers of the Best Clamroast "Sad Iron" in the world for Families, Dress and Cloak Makers and Tailors. Send for Circulars and Sample Irons. Agents wanted everywhere.

AXES

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The time is not and never has been when one brand will long command a better price than another of equal or superior merit, nor when a good reputation can be maintained without a rigid maintenance of good quality. \$1 per dozen about covers the difference in prices of the various so-called first quality brands of axes. The difference is not sufficient. The seconds from first-class axes are much superior to the firsts of most manufacturers. No one can afford to make either, for the difference in cost is not relative to the difference in quality. A careless finish is a safe indication of internal irregularities. People who don't make good axes, do not because they cannot. The requirements are, a thorough knowledge of the business, a natural taste for it and an inflexible determination that the goods shall bear witness to these possessions. This is the rule we invite you to apply in your judgment of our axes. Our prices are based on the cost of production and if they are lower than some others it is because you are asked to pay more for the others than they are worth. We make all patterns and all styles of finish, both Single and Double Bitts, overlaid and inserted steel. We will be pleased to hear from you and to have an opportunity to bid for your valued orders. Our goods may be bought also, at our best prices and terms, at either of the well-known agencies named below.

WM. H. COLE & SONS, Baltimore. J. C. McCARTY & CO., New York. I. H. AMOS, Portland, Ore.

MANNN EDGE TOOL CO., LEWISTOWN, PA.

Warranted Better than the Best

ENGLISH ANVIL

Face in one piece of BEST TOOL CAST STEEL, PERFECTLY WELDED, perfectly true, of hardest temper, and never to come off or "settle." Horn of tough *unttempered steel*, never to break or bend. *Only Anvil made in United States fully warranted as above.*

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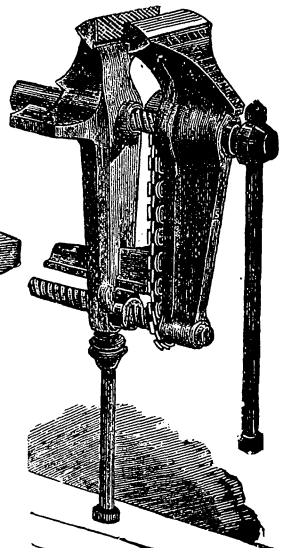
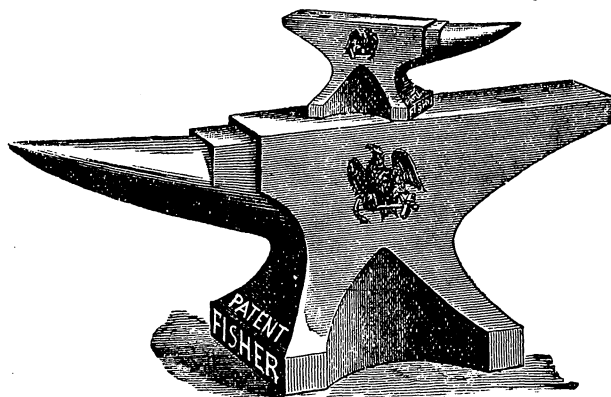
IS FULLY WARRANTED STRONGER THAN ANY OTHER LEG VISE, AND ALWAYS PARALLEL. Is the best Vise for Machine Shops and Blacksmiths, and for all heavy work. ACCURATE AND DURABLE. Send for Circular.

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MORE THAN 200 DIFFERENT PATTERNS.

None Genuine without our Trade-Mark,

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Sold in New York by our agents, J. C. McCarty & Co., 97 Chambers St., The Russell & Erwin Mfg. Co., 45 Chambers St.

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but it is a very difficult task. SOME OF OUR FRIENDS say our "ads." DO US AN INJUSTICE, as we, having a first-class line of goods, should be MORE DIGNIFIED in our methods of advertising. We will try. WE DESIRE TO PRESENT to your notice our line of braces, consisting of 19 DIFFERENT STYLES OR NUMBERS, several of which are made in sizes ranging from "6 to 14 inches," others "8 to 14 inches" and lowest grades, "8 to 12 inches."

Since WE OBTAINED possession of this plant, we have PERFECTED ALL parts which were defective. Broadened the wearing surfaces, strengthened the ratchets, INSERTED STEEL where formerly malleable iron, and now can furnish you with an entire line of braces, which we will guarantee very much superior to those produced by our predecessors and equal in every respect to any braces in the market.

We assure you, we will appreciate your orders. We will furnish you with goods of such satisfactory quality, give your commands such prompt attention and treat you with such business courtesy, that you will feel warranted in continually extending the line of our braces which you now carry. As it is possible you may not have our latest price-list, we will be greatly pleased to mail same on application. If you have never handled our wares, we will thank you for a sample order, or favor us with your address, that we may instruct our representative to call on you with samples. We take this opportunity to THANK OUR FRIENDS for their liberal patronage and will spare no effort to merit the confidence reposed in us.

124-126 Washington Street, Buffalo, N. Y.

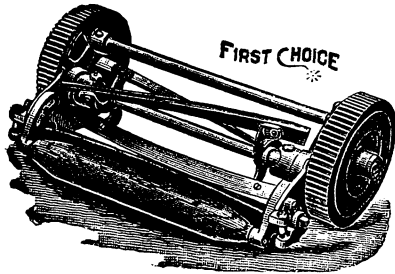
THE AMERICAN BIT-BRACE & TOOL Co.

SURPLESS, DUNN & ALDER,

— INCORPORATED, —

Nos. 97 Chambers and 79 Reade Streets, New York.

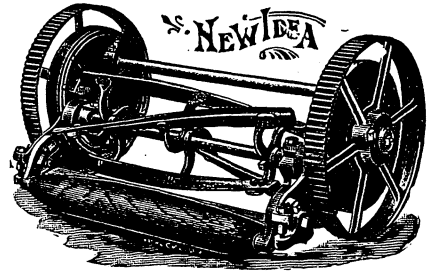
Representing only Leading American Hardware Manufacturers.



LAWN MOWERS.

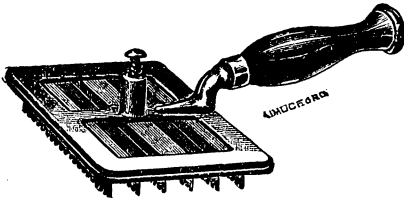
Both our Low and High Wheel Mowers have the right and left hand adjusting screw. Reel shaft runs in box, where all wear can be taken up.

Every machine guaranteed.

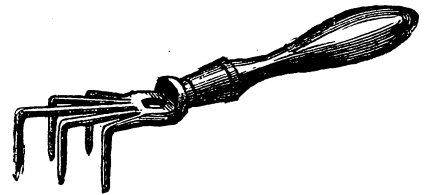


A full line of Boys' Garden Sets, Floral Sets Kitchen Hardware and Hardware for Children's Carriages.

Sole makers of the celebrated "Maud S." Self-Cleaning Curry Comb.



B. B. NOYES & CO.,
Greenfield, Mass.



Send for full Catalogue and Prices.

THE BUCKEYE MFG. CO.,

UNION CITY, INDIANA.

The Gem Post Hole Digger.

This AUGER bores rapidly and is easily operated. It will open wide when dumping the dirt, which may be entirely removed from the hole—whether wet or dry, fine or coarse—by closing the blades.

The GEM is the only post hole auger having blades so shaped as to allow them to close in a perfect manner at points, and sufficiently to retain the dryest and even the finest dirt or sand. This great improvement and point of superiority over any and all other augers is the result of blades of a particular shape, which shape is superior to that of any other post hole of peculiarly patented.

The

Will open with the using one other machine, one-half may be used either way, first taking of main replacing

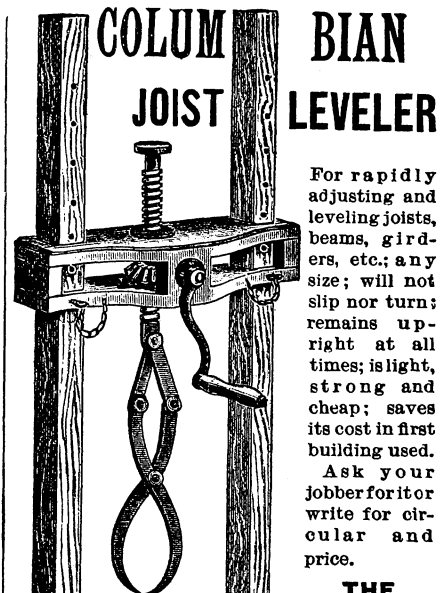
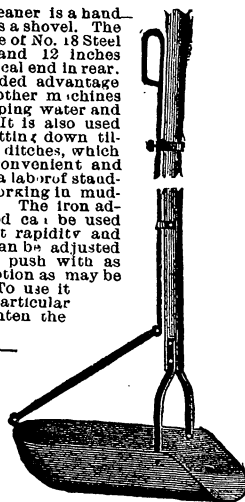
Boss 2-speed Boring Machine.

operate a two-inch auger same effort required in and one-half inch in any chine, and for the small have a speed two and times faster. Two augers kept in the machine, to of which it is only use to point it downward by ing the gear frame out frame inverting and it.

Lightning Drain Cleaner.

The Drain Cleaner is a hand machine used as a shovel. The dirt pan is made of No. 18 Steel 3 inches deep and 12 inches long, with vertical end in rear. It has a decided advantage over other machines in lifting water and dirt. It is also used for letting down tiling in ditches, which is very convenient and saves extra labor of standing and working in muddy ditches. The iron adjusting rod can be used with great rapidity and ease and can be adjusted to pull or push with as quick a motion as may be desired. To use it in any particular shape tighten the set screw.

Send
for
Prices.



Made in two sizes. No. 1 carries from 2 to 8 ins. No. 2 carries from 2 to 12 ins.

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Columbian
Mfg. Co.**

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SNELL MANUFACTURING CO., 72 Reade St., New York,

MANUFACTURERS OF

Ship Augers, Auger Bits, Boring Machines and Boring Implements.

ESTABLISHED 1790.

FIRST PREMIUM AWARDS: Mass., 1841, 1848, 1850; International Ex., Paris, 1878; Centennial Ex., Phila., 1876



Manufacturers of Car Bits, Jennings' Pattern Auger Bits, Boring Machine Augers, Carpenters' Augers, Mill Augers, Rafting Augers, Gimlets and Gimlet Bits, and Screw-driver Bits.

All Kinds of Machine Bits Made to Order.

All Goods made of the Best Quality of Cast Steel and Warranted. First Premium Medals taken for Superior Quality and Excellence of Finish.

Factory, - - - Fiskdale, Mass.



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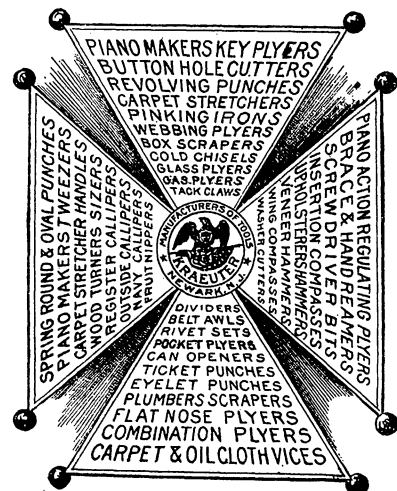
HOME



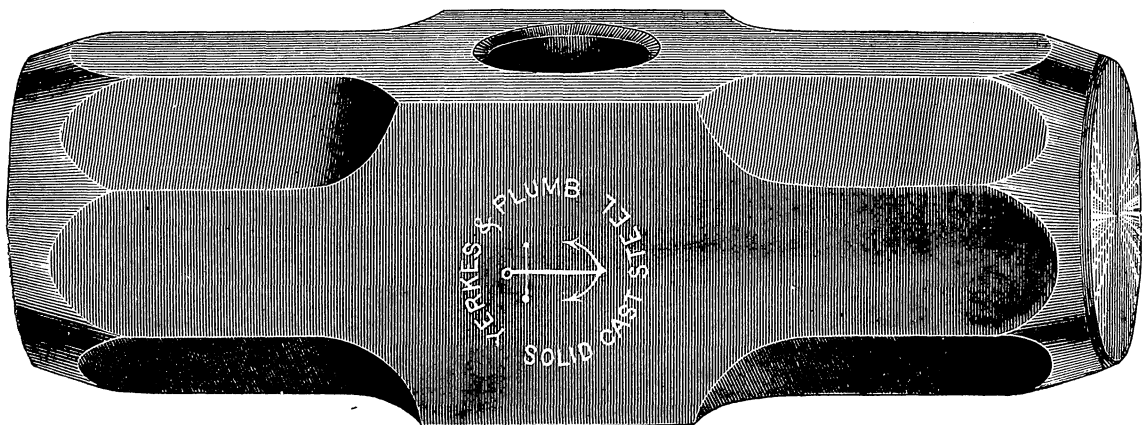
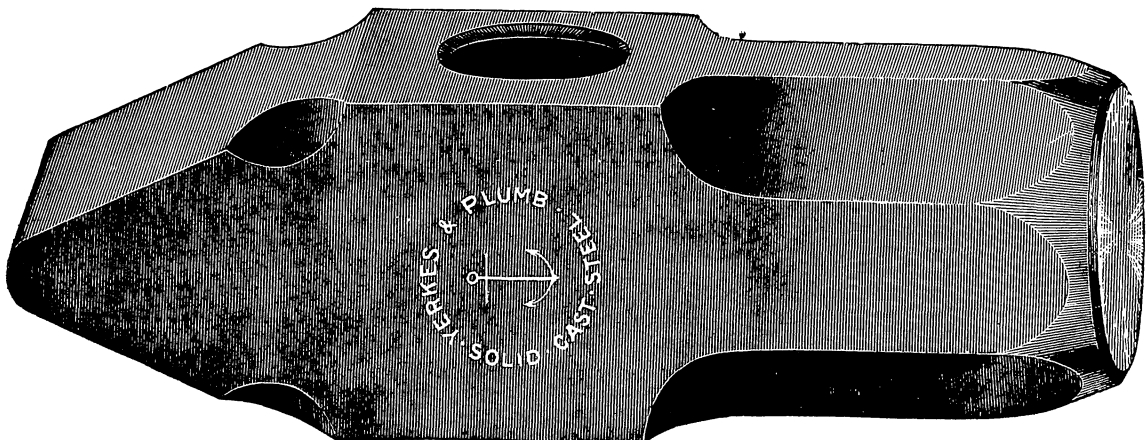
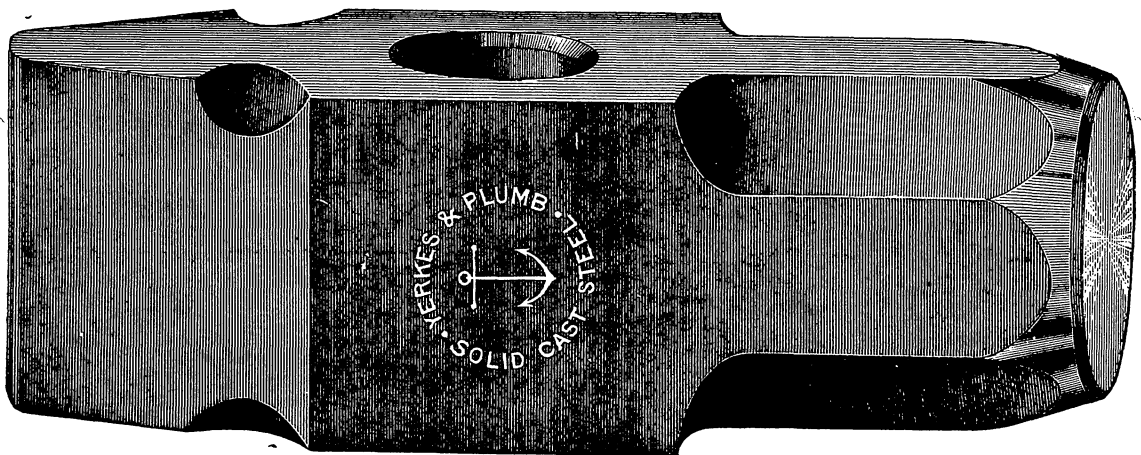
Instantly—see crew, we mean, with the HOWARD-ALLARD SCREW DRIVER. Original Patent Spiral Clutch Triple Bit. Quality High, Price Moderate. Two Sizes, each packed in a durable box, and filled with Three Sizes Bits. You press forward on Handle, the Spiral turns the Screw. Get the Original "ALLARD" from your Jobber, or write us for Circular and Prices.

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Fayette R. Plumb,
MANUFACTURER OF
Edge Tools, Hammers and Sledges,
Railroad, Miners' and Blacksmiths' Tools.
PICKS, MATTOCKS and GRUB HOES.



PHILADELPHIA, PA., U. S. A.

THE AMERICAN AXE AND TOOL CO.,

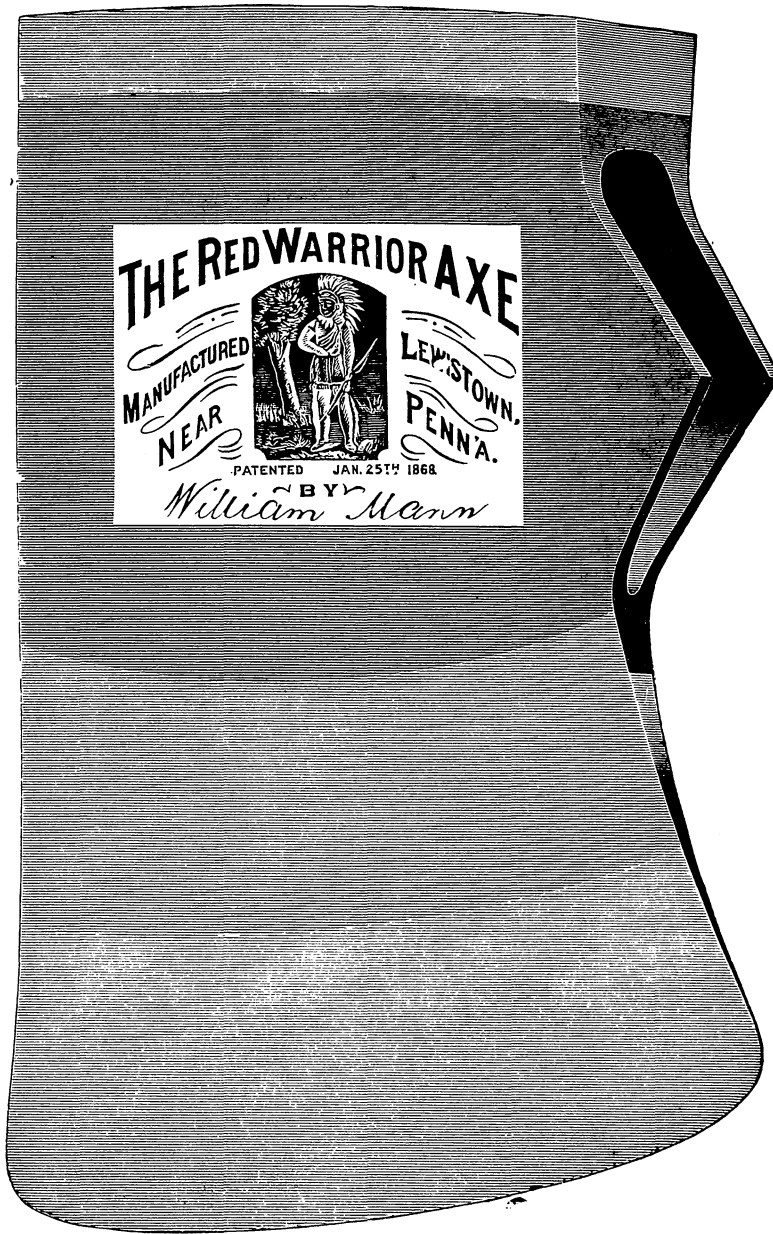
STEWART BUILDING, Rooms 63 to 67,
280 Broadway, - - - **NEW YORK.**

Manufacturers of

BLOOD, HUNT, LIPPINCOTT, RED WARRIOR, MANN, HURD, PEERLESS, JAMESTOWN,
ROMER, FRANCIS, SHARPS, UNDERHILL, STEWART,

Brands of

AXES, HATCHETS, BROAD AXES and ADZES, also "Blood's" Champion and
"Hubbard's" Diamond Blade SCYTHES.



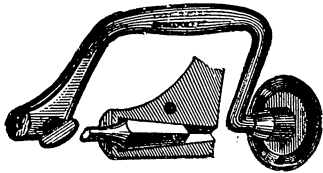
Grass Hooks, Corn Knives, Bush Hooks, Planters' Eye Hoes, Ice Axes, Ice Hatchets and
Firemen's Axes, Wood Chisels, Picks, Mattocks, Brick Hammers, Box Openers, Ice Chisels, Butchers'
Handled Axes, Meat Hatchets.

ALWAYS IN STOCK: Best Leading Brands of Axes and Edge Tools. Cheap Handled
Axes, Medium Grade Axes. Boys' and Hunters' Axes. **Job Lots of Axes, all Grades
and Patterns.**

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JOHN S. FRAY & CO.,

BRIDGEPORT, CONN., U. S. A.



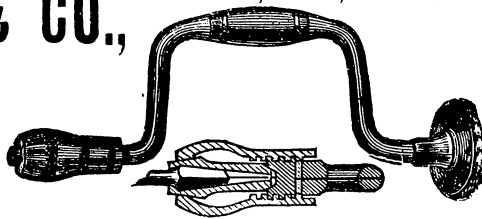
Spofford Bit Brace.

The Spofford Bit Brace is made under Letters Patent of the U. S. A., granted to N. Spofford, March 23
1880 assigned to John S. Fray & Co.
All Iron, Five Sizes.

No. 7.....7 inch sweep.
No. 8.....8 "
No. 10.....10 "
No. 12.....12 "
No. 14.....14 "

Cocobolo Head and Handle, Nickel Plated.
No. 107.....7 inch sweep.
No. 108.....8 "
No. 110.....10 "
No. 112.....12 "
No. 114.....14 "

Spofford Sleeve Brace.



Sleeve Brace, Nickel Plated.
No. 70.....7 inch sweep
No. 80.....8 "
No. 100.....10 "
No. 120.....12 "

TWIST DRILL BIT FOR WOOD.



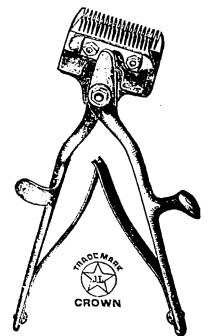
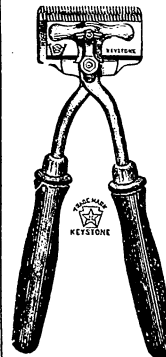
—MANUFACTURERS OF—

Adjustable Monkey Wrenches, Parlor Door Hangers, Adjustable Hollow Augers, Standard
Clamps, Adjustable Clamps, Twist Drill Bits for Wood, Carpenters' Clamps, Spoke Shaves.

THE CINCINNATI TOOL CO.,

CINCINNATI, OHIO, U. S. A

IF YOU ARE INTERESTED IN CLIPPERS



For HORSEMEN OR BARBERS

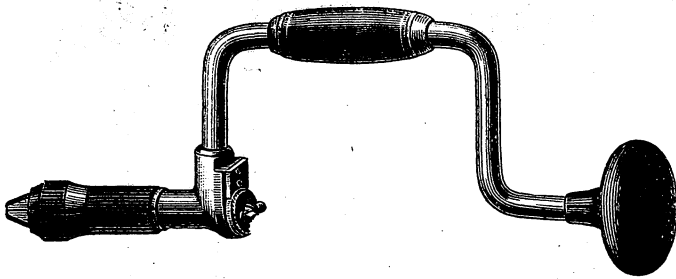
Send Postal Card for our new Illustrated
Catalogue.

JESSE LEE & SON,

37 SO. FOURTH ST., PHILADELPHIA.

Telephones, Their Construction and Fitting. A
Practical Treatise on the Fitting Up and Main-
tenance of Telephones and the Auxiliary Appara-
tus. By F. C. ALLSOP. 191 pages, cloth...\$2.00

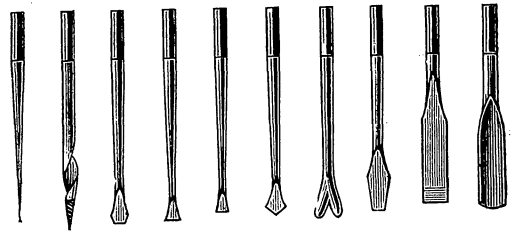
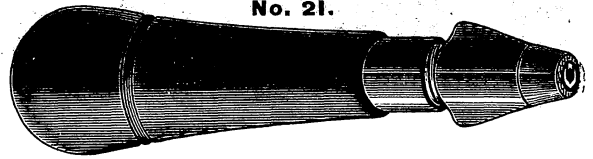
For sale by DAVID WILLIAMS, 96-102 Reade st., N. Y.

Standard Bit Brace Ratchet.

Patented.

Standard Tool Handle.

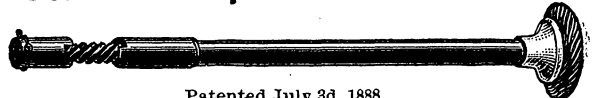
No. 21.



Patent Applied for.

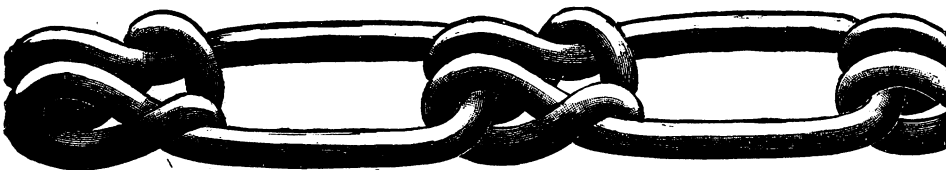
Standard Screw Driver.

Patented March 25th, 1890.

Standard Spiral Screw Driver.

Patented July 3d, 1888.

CHANTRELL TOOL CO., Manufacturers, - - READING, PA.



The Bridgeport Chain Co.'s Triumph Chain, made into Halters, Traces, Cow Ties, Tie-

outs, Kennel Chains, &c.; also cut to lengths for manufacturers' use.

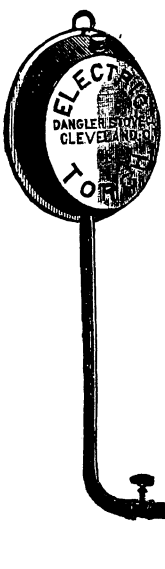
The cut represents the exact size of 6/O.

Thirteen Sizes made, 6/O being the Largest.

**FACTORY AT
BRIDGEPORT, CONN.**

Yacht AND Boat Hardware.

L. W. FERDINAND & CO.,
BOSTON, MASS.



Dangler
Electric

Torches

FOR
GASOLINE
OR
OIL

14 JETS OF LIGHT

3 to 6
INCHES
LONG.

FOR lighting manufacturing establishments, such as Rolling Mills, Foundries, Machine Shops, Engine Rooms &c., &c., with a convenient, portable brilliant, steady light, and by cheaper means than by Coal Gas.

SOLE MANUFACTURERS,

The Dangler Stove & Mfg. Co.,
Cleveland, Ohio.

Hand Screws

Case and Glue Clamps

*Cabinet Makers
Benches*

Hand Screw Spindles made of strictly second growth Hickory—never anything else.

All threads cut with a saw to leave the grain solid—a patent process.

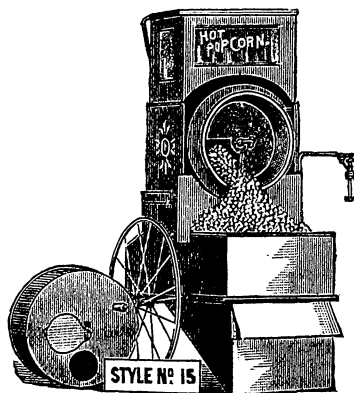
Nearly 700 of our Benches used by Grand Rapids Furniture makers alone.

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Grand Rapids Hand Screw Co.

GRAND RAPIDS, MICH.

CHICAGO AGENTS, BRITTAN & BOND, 154 LAKE STREET.



**OLSEN'S AUTOMATIC
King of Corn Poppers, Peanut
and Coffee Roasters.**

The greatest wheel of fortune out, for any person 12 years and upward; \$1.00 to \$50.00 profit per day; 1500 now in use.

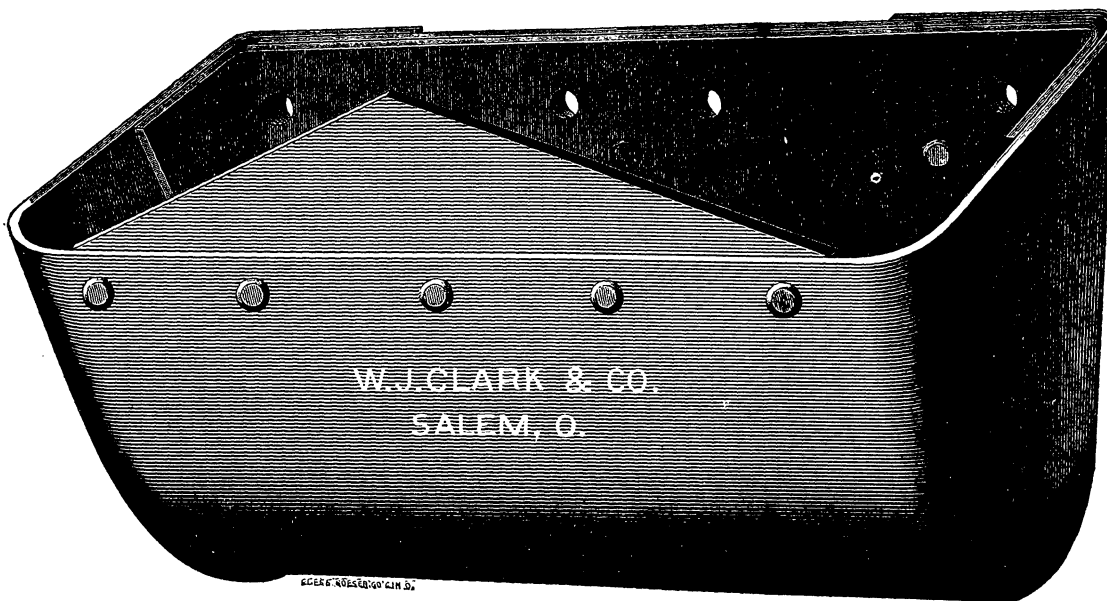
Guaranteed to have no equal. Agents wanted.

Write for illustrated catalogue and prices on Pop Corn, Shelled or on Cob, Balls, Bricks and other supplies.

A. B. OLSEN, Sole Mfr.,

218-220 E. Mo. Ave., - - Kansas City, Mo.

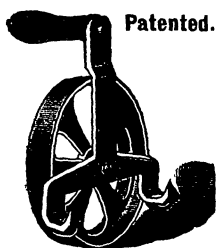
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Buckets always in stock. Any size.



Elevating and Conveying Apparatus
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Extra heavy "SALEM" elevator buckets with **DIGGERS** to enable them to load themselves when used for loading cars with dirt, sand, gravel, &c. We make them of any size and of any strength required.
W. J. CLARK & CO., General Sheet and Plate Metal Workers, **SALEM, OHIO, U. S. A.**
Send specifications for estimates on any special work wanted.

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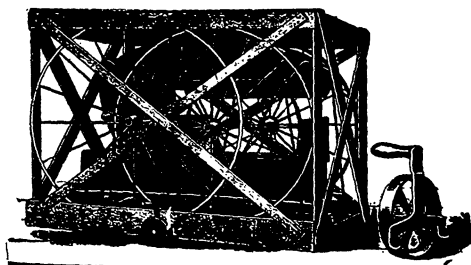


One pair will
Carry 4000 pounds.

Fits any size Crate or Box,
open or tight.

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A Compendium of Business
and Domestic Law for
Popular Use.

By **H. B. COREY,**
Member of the New York Bar,

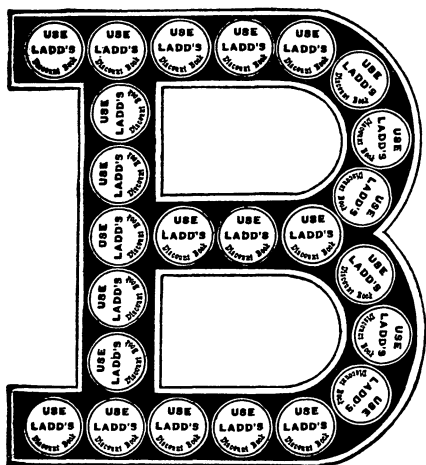
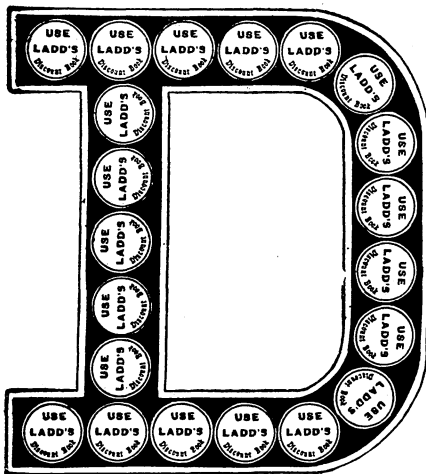
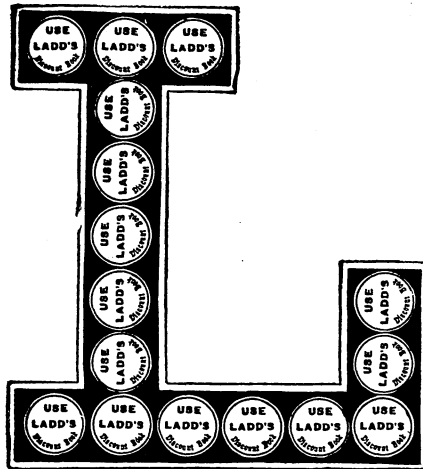
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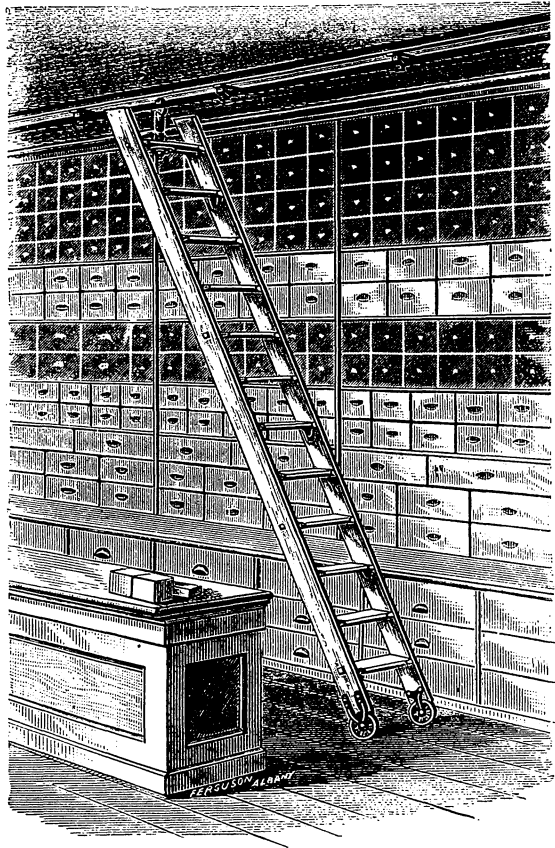
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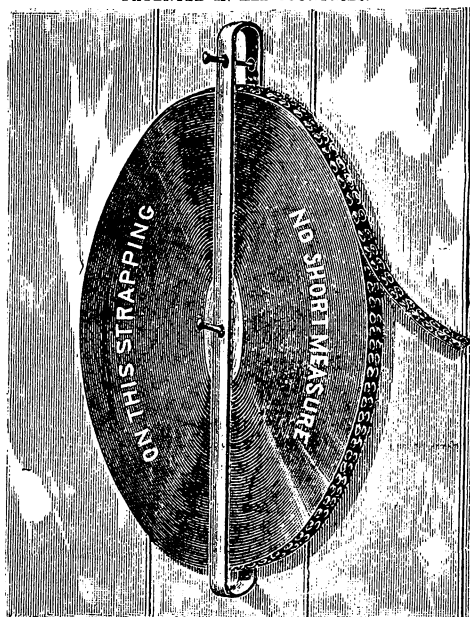
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BOX AND CRATE CORNERS,
PAIL COVER CLASPS,
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AND EVERYTHING FOR PACKERS



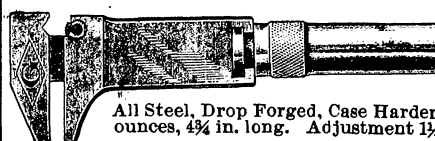
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WITH SPOKE GRIP ATTACHMENT.

All Steel, Drop Forged, Case Hardened. Lightest, neatest and strongest. Weighs 5½ ounces, 4¼ in. long. Adjustment 1¼ in. Write for prices and descriptive circular.

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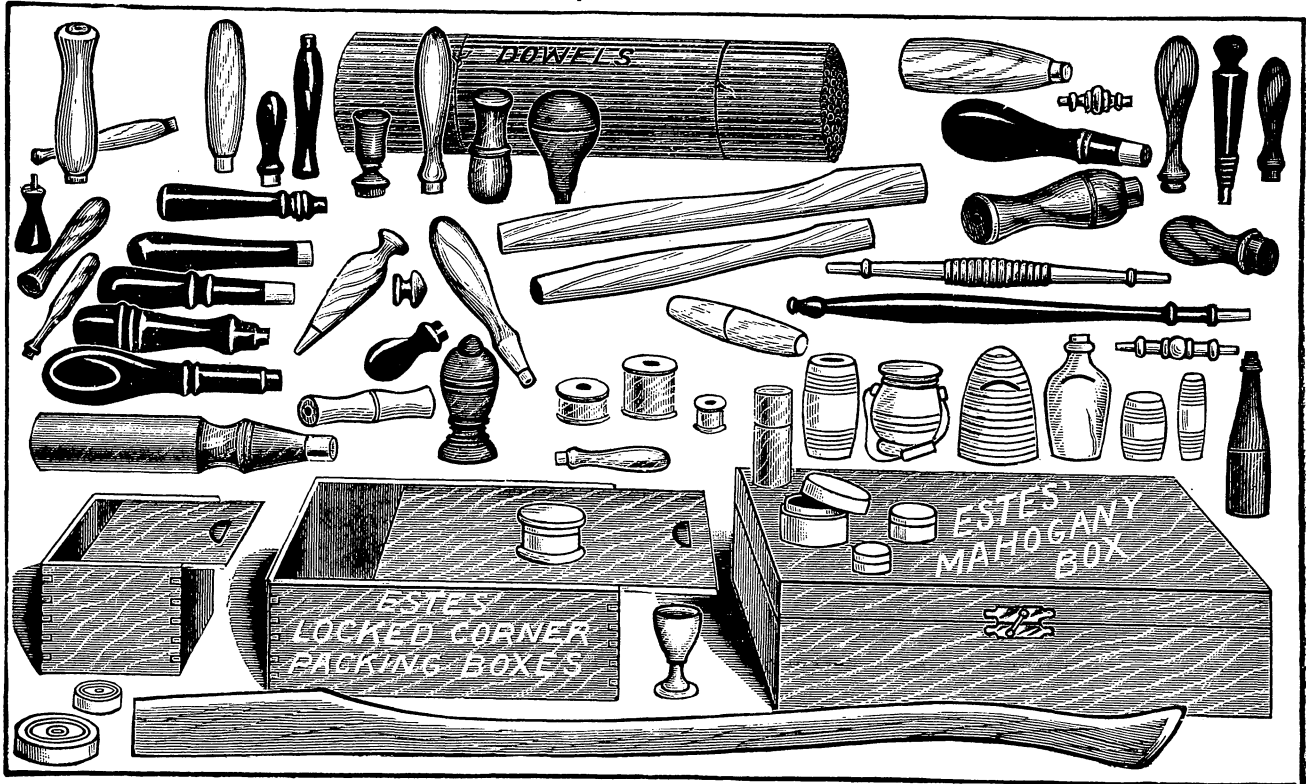
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LOCKED CORNER PACKING BOXES, Turned Wooden Boxes, Fancy Boxes, Dowels, Spindles, Wooden Toys and all kinds of Square and Round Wood Work.

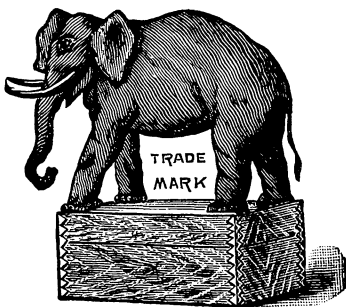


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Hardware manufacturers of all kinds and large users of paper boxes will find it to their advantage to correspond with us regarding the lease or purchase of machinery by the use of which even *unskilled and inexperienced hands* can make *quickly and cheaply* our new *Metal Edged Boxes*.

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Manufacturers and Dealers in Steel, Copper and Brass Wire of all kinds.

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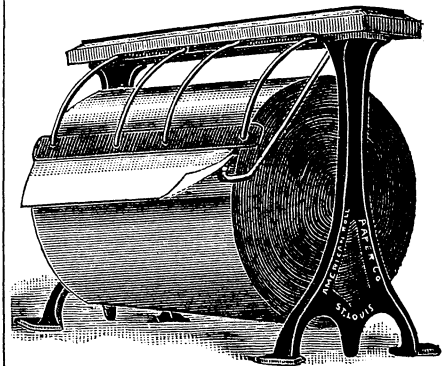
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Dealers who handle it do away with the Broken Bundle Business and sell small quantities by the spool only. It is a convenience for both dealer and consumer. It is Shellac Coated and Cannot Rust: is wound like spool cotton on 1 oz., ¼ lb., ½ lb., 1 lb. and 5 lb. Spools.

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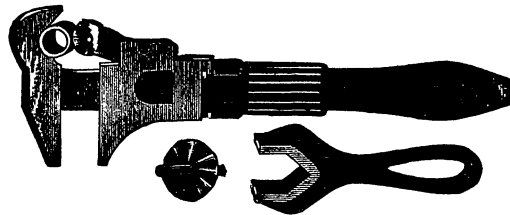
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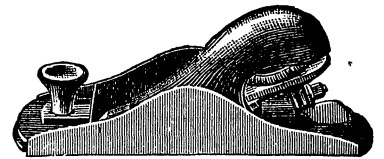
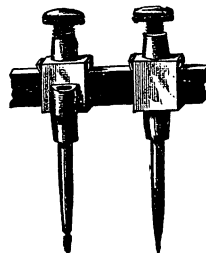
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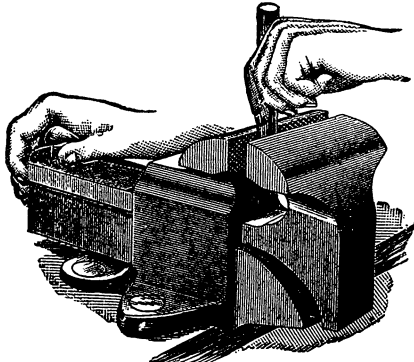
HIGH QUALITY TOOLS



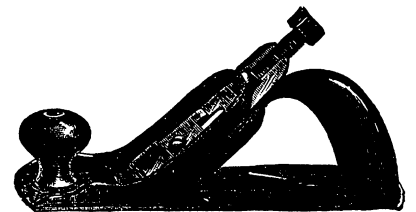
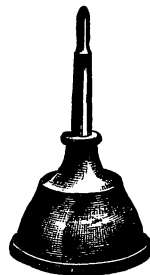
Donohue's Pat. Engineers' Wrenches,
Short or Long Sleeve Nuts, and
with Pipe Cutter.



Chaplin's Patent Iron Planes,
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Checkered Rubber
Handles.



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Challenge Iron Planes.
Simplicity of Construction.

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Wood's Pat. Plumb and Levels, Devoe's Square Attachments, Gem Wrenches,
Malleable Oilers and Lamps, Pencil Attachments.

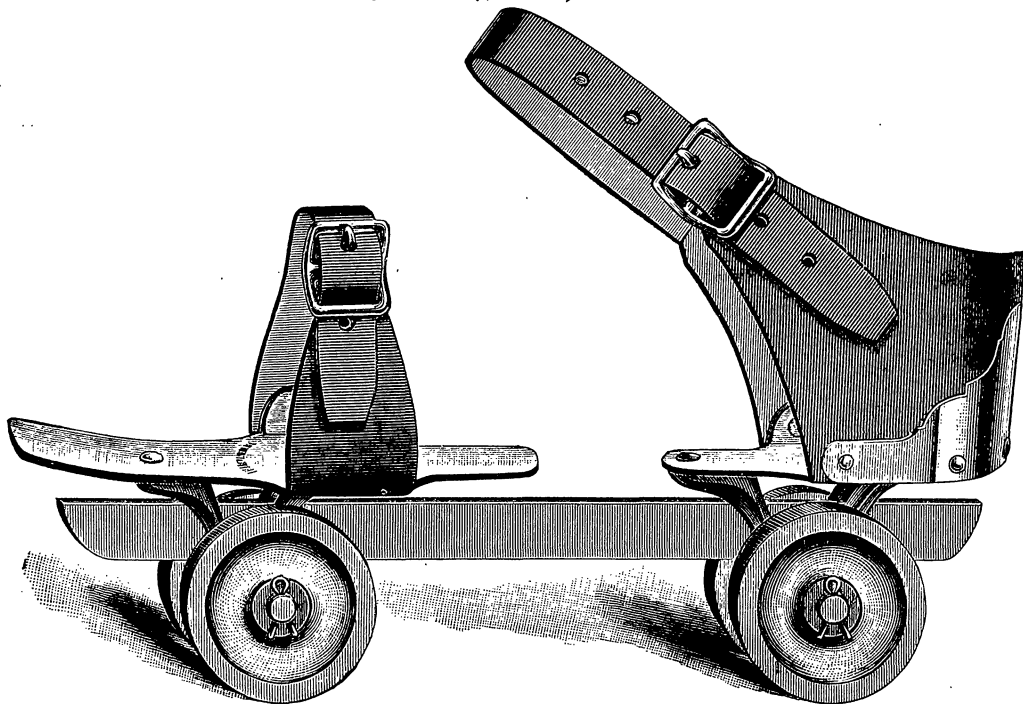
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SIDEWALK AND RINK ROLLER SKATES OF ALL KINDS.

—:MADE BY:—

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Gloucester, Mass. New York City.

JOHN J. TOWER, of Tower & Lyon,
New York, President.

C. E. HUBBARD, Boston
Treasurer.

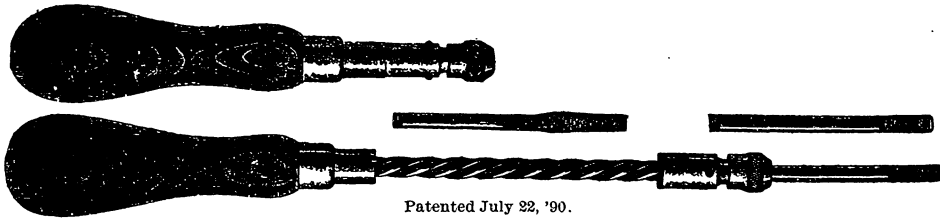


The Improved Process Glue Co., having purchased from The Le Page Co., all its patent rights, formulas, glue stock and material, and having secured control of its glue factory, machinery, etc., will continue the manufacture of Liquid Fish Glues in all the various grades heretofore offered by The Le Page Co., under the personal supervision of Mr. Wm. N. LE PAGE, and under the Improved Process Patent issued October 26th, 1886. As is well known, the Improved Process by which these goods are made assures the highest strength with thorough uniformity as to quality, consistency and color. We call special attention to our Improved Process Family Glues, neatly put up for family use, and also to our Improved Process Carriage Glue for wood-work, put up in every variety of size and style. This Carriage Glue is undoubtedly the strongest and best glue for every variety of cabinet and wood-work, and has earned its high reputation. All our canned glues are put up with the new patent cap or fastening, patented January 22d, 1889, which has proved a great convenience and success. Our glues will be readily identified by our characteristic Blue Label, and the Trade-Mark shown at the head of this page. Send for Price-List. Messrs. Tower & Lyon will have charge of our New York office. Very truly yours,
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NOW IS THE TIME to replenish your stock of **GOODELL'S AUTOMATIC SCREW DRIVERS.**

Watch this space next month

An Automatic
Ratchet
and Plain
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all in one.



Patented July 22, '90.

The
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STANDARD.

All live jobbers carry them. *Accept no substitute.* Cheap tools are dear at any price. All our goods are made to work well, last long, and reflect credit upon the dealer who sells them and honor upon the whole Hardware fraternity. We have several new specialties shown in our new catalogue. Do you want a copy?

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Selling Agents: C. E. JENNINGS & CO., 79 Reade St., New York City, N. Y.

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ALL ARE EQUIPPED WITH THE CYLINDRICAL BURNER.

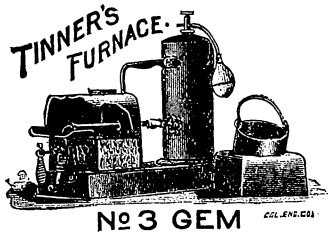
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Copper Pot for No. 3 or 4, 50 cents.
No. 3 guaranteed to work out of doors or on roofs in all kinds of weather
No 4 will melt 12 lbs. of lead in 8 minutes, and will heat the coppers and melt lead at the same time.

For Sale by all First-Class Jobbers, or Send to us for Descriptive Circulars.

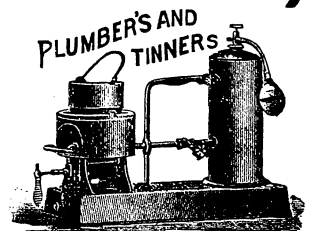
Burgess Soldering Furnace Co.,

J. BURGESS & SONS, Props. and Mfrs.

COLUMBUS, O.

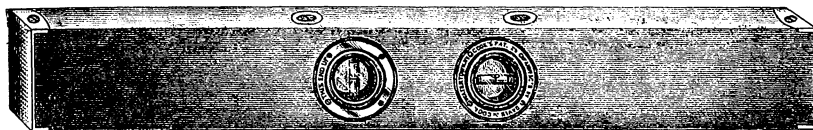


No 3 GEM



No 4 GEM

**COOK'S
PATENT
LEVEL.**

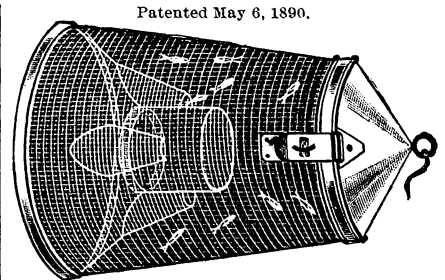


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Inquire at your nearest hardware store
for them. If not in stock, send to

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OTHER.

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LITTLE DAISY MINNOW TRAP.

A sure thing for good, live minnows. Will last a lifetime. Price, single trap, \$3.50. Liberal discount to the trade.

Illinois State Fish Commission,
Office of S. P. Bartlett, Sec'y,
QUINCY, ILL., Jan. 19, 1892.

Messrs. Cochenour & Wilson, Olney, Ill.
After two years' use of your "Little Daisy Minnow Trap" I find that it does its work well and satisfactorily. It is a source of great gratification to me to have fresh, lively minnows when I want them, and these your trap furnished me. I can cheerfully recommend it to anglers as a valuable addition to their outfit. Yours respectfully,
S. P. BARTLETT, Sec'y Ill. State Fish Com.

ED. C. WILSON, Exclusive Manufacturer,
OLNEY, ILL.

THE WINNER MANUFACTURING CO.
HAMILTON, OHIO, U.S.A.
PATENTED SPECIALTIES.

YANKEE WRENCH.
ADJUSTABLE STOVE TRUCK.
HERCULES TRUCK.
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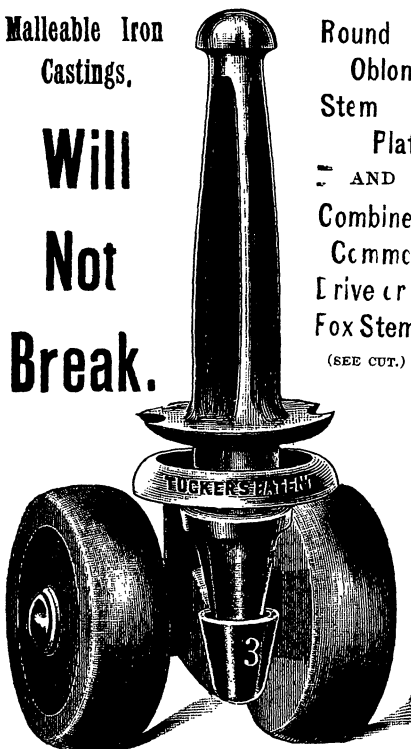


TUCKER'S PATENT FURNITURE CASTER.

Malleable Iron
Castings,

Will
Not
Break.

Round
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Stem
Plate
AND
Combined
Common
Drive or
Fox Stem.
(SEE CUT.)



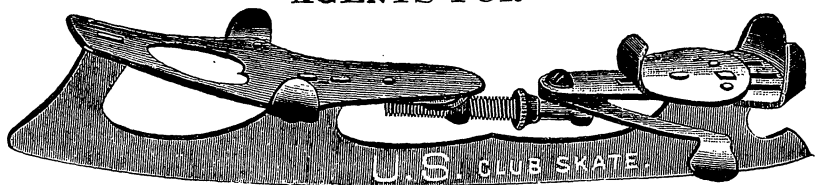
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INDIANAPOLIS.

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A full assortment kept in stock.

TRAVERS BROS. CO.,

—MANUFACTURERS OF—

PURE MANILA AND SISAL

ROPE.

MANILA, SISAL AND MIXED

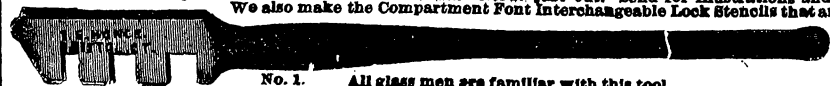
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Mexican Hammocks, Hammock Attachments, Peerless Sash
Cords, Hardware Twines, Agts. Silver Lake Sash Cords.

Office, 107 Duane St.

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We also make the Compartment Font Interchangeable Lock Stencils that are having such run.

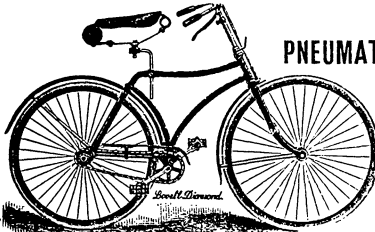


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All glass men are familiar with this tool.

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Lovell Diamond Cycles



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PNEUMATIC, CUSHION AND SOLID TIRES.
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Without much trouble?**

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WESTERN WHEEL WORKS.

BICYCLE MANF'TRS



From \$20 to \$135.

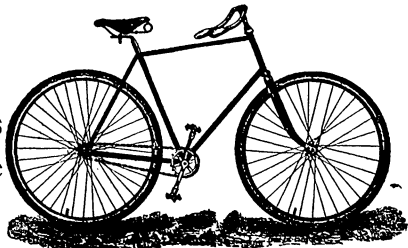
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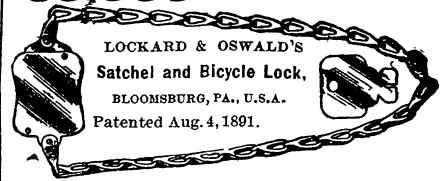
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are older, but none
better.



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ELEGANT DESIGNS
AND
BEAUTIFUL FINISH.

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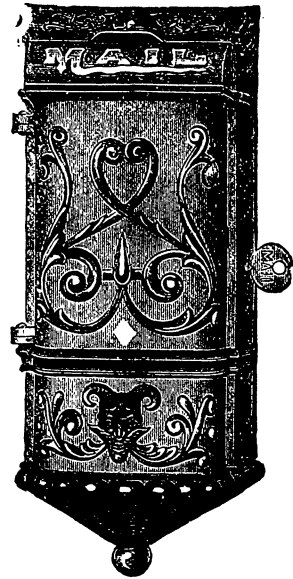
30,000 SOLD LAST YEAR.



LOCKARD & OSWALD'S
Satchel and Bicycle Lock,
BLOOMSBURG, PA., U.S.A.
Patented Aug. 4, 1891.

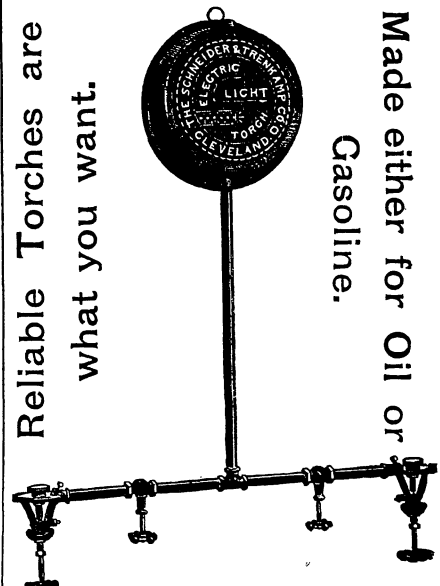
The **HENRY C. HART MFG. CO.,**
DETROIT MICH.
MANUFACTURERS OF
Hardware Specialties.

Send for Catalogue and Prices.



Full Line of Mail Boxes.

Reliable Torches are
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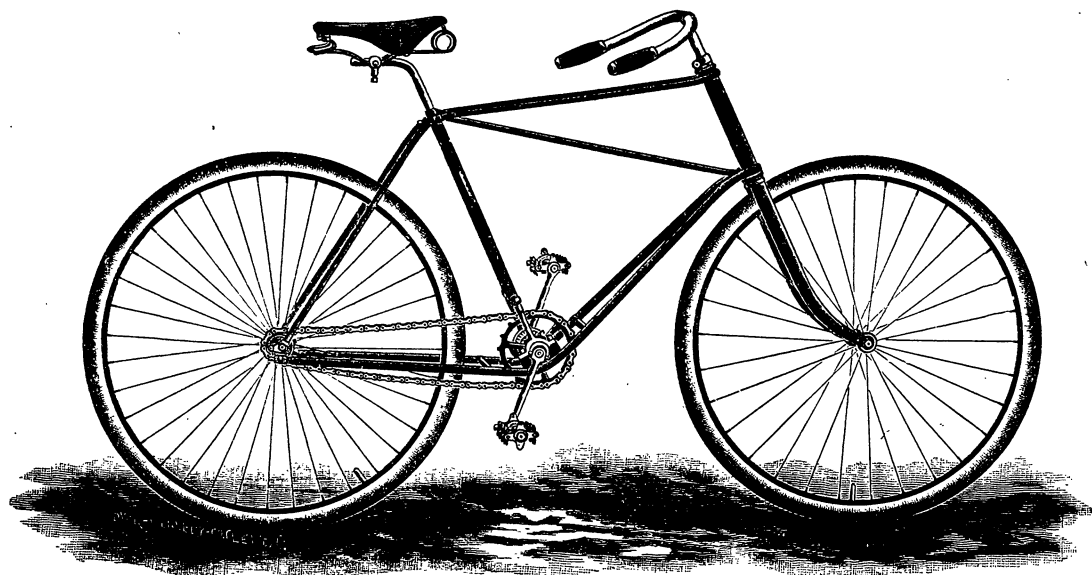


Made either for Oil or
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These Torches are particularly adapted for use in Factories, Foundries, Machine Shops, Rolling Mills, Blacksmith Shops, Warehouses, &c. They make a strong white light, are free from smoke and are not affected by wind or rain. They are convenient and portable. These Torches can be run at an expense of about one-half cent to one cent per hour, burning a bright, steady light which is ten times greater than the light of an ordinary gas burner. Write us for prices. A liberal discount given to the trade. Manufactured by
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"The Improved Humphrey Hand Elevator,"
Made specially to be sold by Hardware Stores. Thousands in use. Catalogues on application.
THE STORM MANUFACTURING CO.
NEWARK, NEW JERSEY.
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WINTON LIGHT ROADSTER.

HIGHEST GRADE THROUGHOUT.

No Agency complete without this **DISTINCTIVE** and thoroughly **FIRST-CLASS** machine.

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WINTON RACER,

Nothing like it. 20 lbs., - - " 160.00

Easiest Running Bearings in the World.

True Double Diamond Frame,

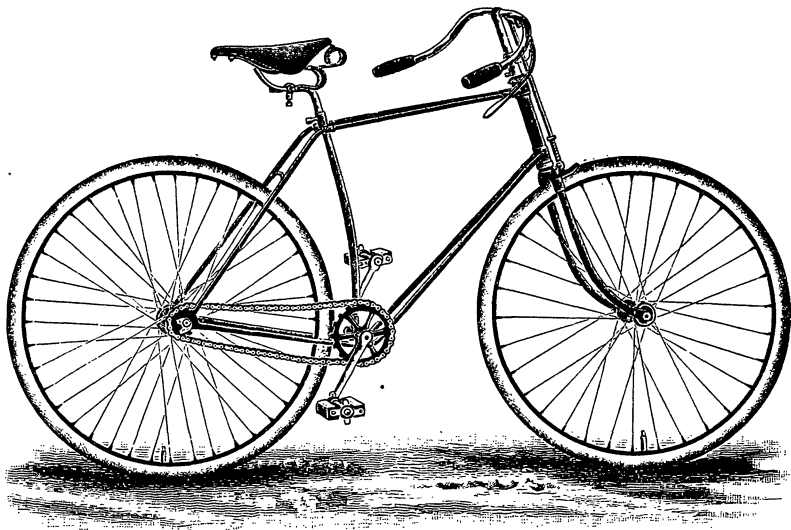
Winton Perfect Pneumatic Tires.

If there is no agent in your place, know all about us by asking for a catalogue.

The Winton Bicycle Co.,

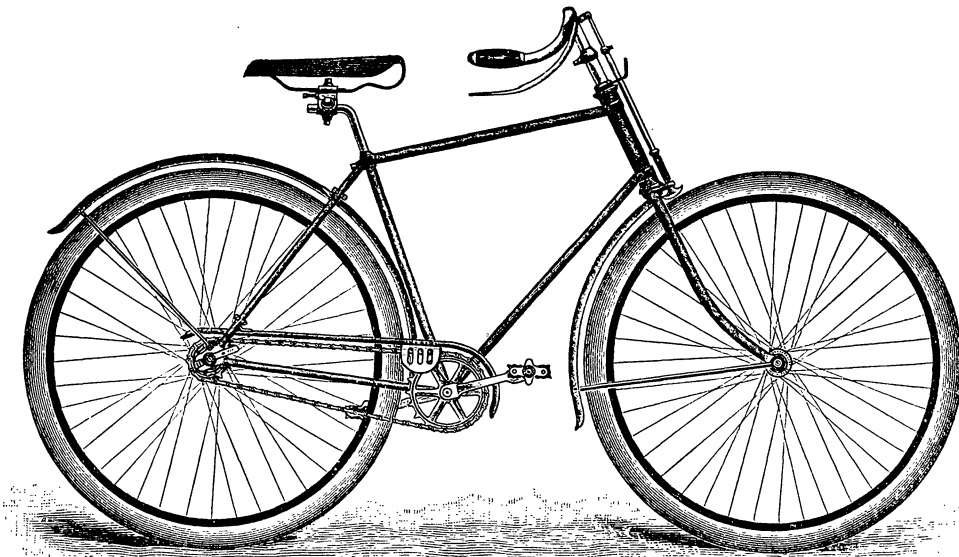
102 PERKINS AVENUE,
Cleveland, Ohio.

OUR GENTLEMEN'S ROADSTERS.



The Hackney, with 2 inch Greyhound Pneumatic Tire, \$150.00

The very best high grade bicycle made. True double diamond frame of weldless steel tube. Complete ball bearings. Simple and complete. Elegantly finished and made of the best materials. 28-inch wheels geared to 59, with the easiest and most perfect adjustment yet invented. Garford '03 saddles. Graceful drop handle bars. Sprocket wheels never come loose. Curtis pedals. Tool bag with complete outfit.



The Falcon No. 1, with 2 inch Morgan & Wright Tire, \$115.00

Made entirely of steel, with double diamond frame of cold-drawn weldless tube. 28-inch wheels geared to 59. Ball bearings throughout. Telescope steering head. Detachable chain and mud guards. Either Garford's three spring saddle, Garford regular saddle or Garford or Yost scorchers. Tool bag with wrench, oil can, air pump and complete tire repairing outfit.

This wheel is better than most of the high grade cycles made and we are sure it will give the best of satisfaction.

Write for our new Bicycle Catalogue.

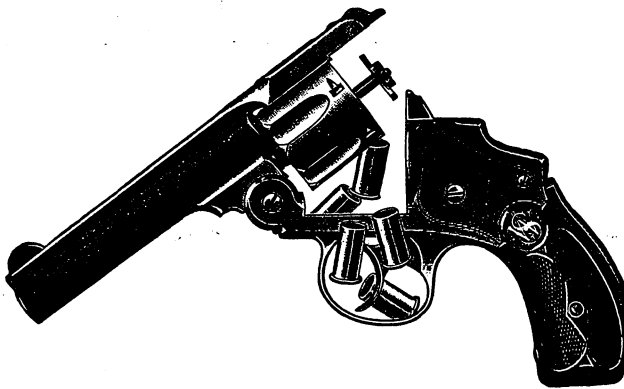
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A NEW DEPARTURE!

The Smith & Wesson Hammerless, Safety Revolver

Provided with Automatic Shell Extractor, Rebounding Lock.

The latest production from the Works of Smith & Wesson, Springfield, Mass., manufacturers of Superior Revolvers, both Double and Single Action.



Calibre 32, Weight 14½ oz.
AND

Calibre 38, Weight 18½ oz.

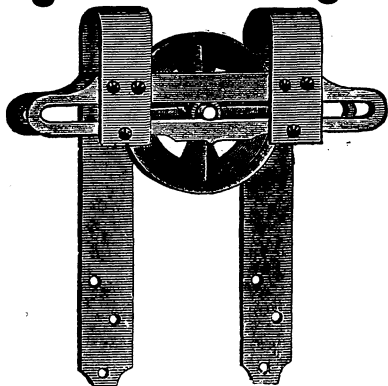
Now Ready.

*Absolute Protection from
Accidental Discharge
Insured.*

SUPERIORITY IN EVERY POINT UNIVERSALLY CONCEDED.

Send for Descriptive Circular.

CHICAGO Big Twin Hanger.



Also a Complete Line of this
Class of Goods.

MANUFACTURED BY

Chicago Spring Butt Co.,
Chicago, Ill.

Motley's Adjustable Sash Holder



Patented Dec. 13, 1897.

FOR WINDOWS, NEW OR OLD,
In Buildings, Cars, Steamboats, Carriages, etc.
Also for Window Screens and Sliding Blinds.

Agents Wanted Everywhere.

Send for Descriptive Circular.

PETER MOTLEY,

750 and 752 S. Broad St., Philadelphia, Pa.

A. S. HENN & CO.,

Manufacturers of

Hardware Specialties, Can Openers, Pocket Wrenches, Mincing Knives, Clothes Line Pulleys, &c.

Send for Catalogue.

NEW HAVEN, CONN.



Explosives and Their Powers. By M. BERTHELOT. Translated and condensed from the French by C. NAPIER HAKE, Fellow of the Institute of Chemistry, Inspector of Explosives to the Government of Victoria, and WILLIAM MACNAB, F.I.C.E. With preface by Lieut.-Colonel J. P. CUNDILL, R. A. H. M. Inspector of Explosives. With illustrations. 8vo, cloth. \$8.60

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MANUFACTURERS OF THE



Improved Automatic Double Action,
3 1-4, 4 & 5 in. Bbls., 32 & 38 Cal.

IMPROVED EJECTING DOUBLE ACTION,
3 1-4 in. Bbls., 32 & 38 Cal.

"Premier" Automatic Double Action Revolvers,
3 1-4, 4 & 5 in. Bbls., 32 & 38 Cal.

This line is unsurpassed for Style, Finish
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The Safety Hammer Double Action,—Patented April 5th, 1897,—made in 3
Calibers, 32, 38 and 44. The American Double Action Revolver in
32, 38 and 44 Caliber, with 2½, 4½ and 6 inch barrels.

The Young America Double Action Line, 22 and 32 Caliber, and
The Vest Pocket Self-Cocker, 32 Caliber, Altogether making the most desirable
line of Double Action Fire-arms manufactured by any Company in the world.

SOLD BY DEALERS IN HARDWARE AND FIRE-ARMS.

WORCESTER, MASS., U. S. A.

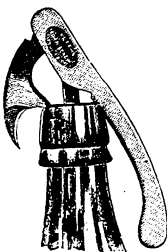


FIG. 3. Showing cork, screw and fulcrum in position to pull cork.

Detroit Cork-Screw Co., Detroit, Mich., U. S. A.

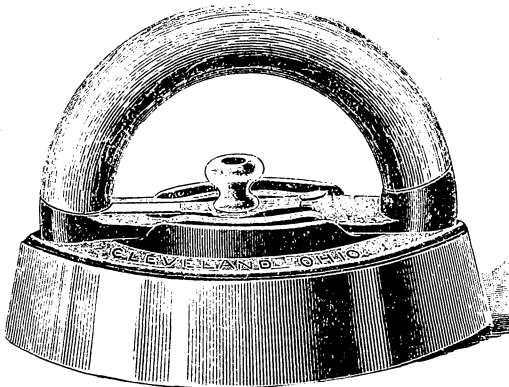
Manufacturers of

The Davis Cork-Screw,
The Davis Knife and Cork-Screw,
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Columbus and Greeley
Cork Extractors.

Manufacturers of

Cut Worm
Spiral Screws and
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Cut Worm Cork-Screws
for the Bar Cork Puller.

Send for Price-List and Discounts.



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MRS. POTTS'

Sad Irons

Elegantly finished in
Tin or Japan.

Send for Catalogue.

EASTERN OFFICE:

82 North St., Boston, Mass.

This GUN has rebounding locks and the barrels can be taken off and put on again without cocking the arm, and when cocked the hammers may be let down gradually, and without the full force of the blow. It is simple in construction, having very many less pieces than any other hammerless gun.

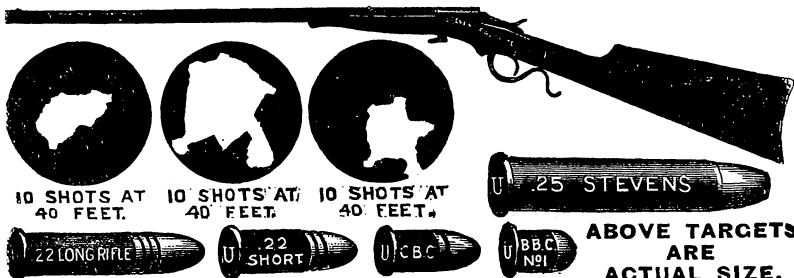
Easily Tipped and Cocked,
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Handsomely Engraved,
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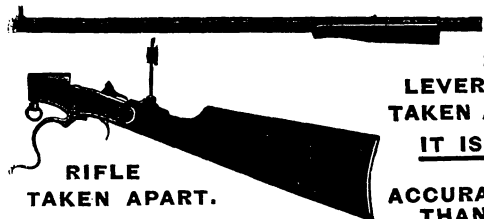


10 SHOTS AT 40 FEET. 10 SHOTS AT 40 FEET. 10 SHOTS AT 40 FEET.

22 LONG RIFLE 22 SHORT CBC BBC NSI

ABOVE TARGETS
ARE
ACTUAL SIZE.

Made for the 22 or 25 Rim Fire Cartridge.



RIFLE
TAKEN APART.

WEIGHT, 4 3/4 POUNDS.
22-INCH BARREL.
LEVER ACTION LIKE SHARPS.
TAKEN APART IN TEN SECONDS.
IT IS SIMPLY IMPOSSIBLE
TO MAKE MORE
ACCURATE SHOOTING BARRELS
THAN ARE ON THIS RIFLE.

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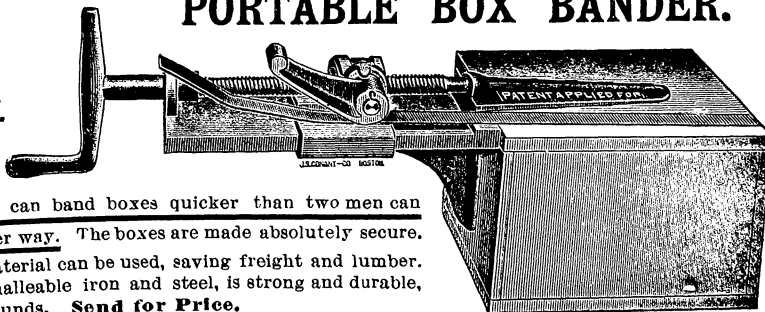
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PAYS
FOR
ITSELF.

PORTABLE BOX BANDER.



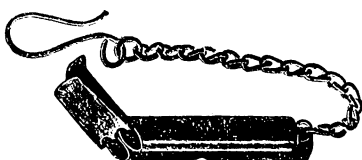
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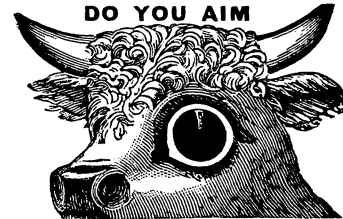
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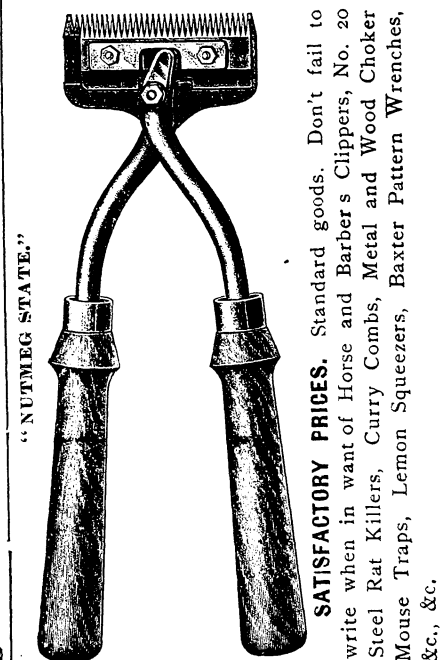
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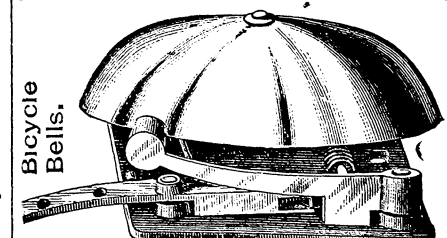
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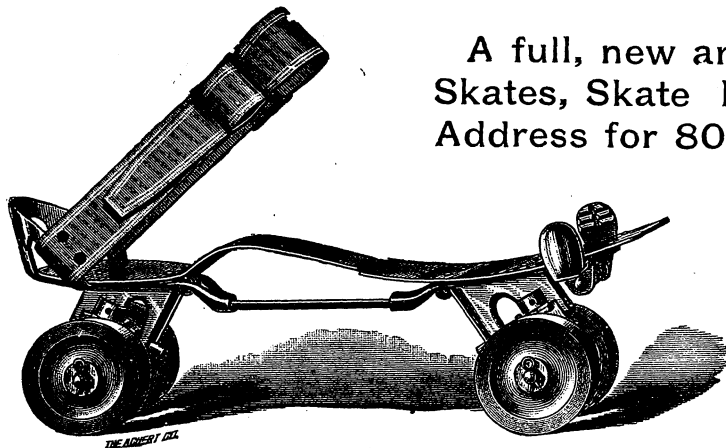
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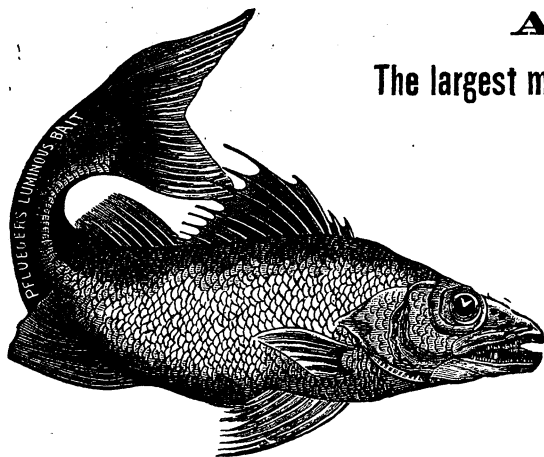
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Trolling Spoons, Spinners, Phantom Minnows, Hard and Soft Rubber Minnows, Frogs, Crawfish, Grasshoppers, Insects, Artificial Flies, Snell Hooks, Furnished Lines, Sinkers, Floats, Fly Cream, Fish Stringers, and many other new goods too numerous to mention.



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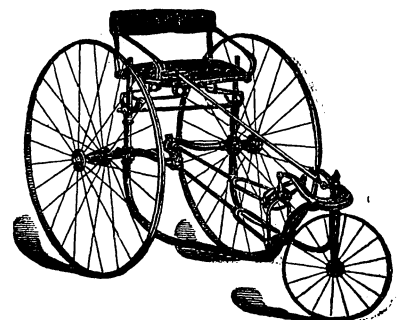
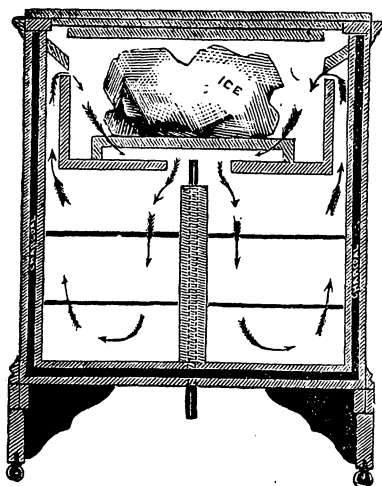
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Refrigerators and Ice Chests,

Guaranteed Dry-Air and Perfect Goods, in 71 Sizes and Patterns. And

The "Queen" Tricycle,

in 20 Sizes and Patterns. The one Tricycle in this country sold to the trade on its MERITS.



Full Illustrated Catalogue and Special Prices Furnished to the Trade on Application.

Challenge Iceberg Hardwood Refrigerators,

Manufactured by

CHALLENGE CORN PLANTER CO.

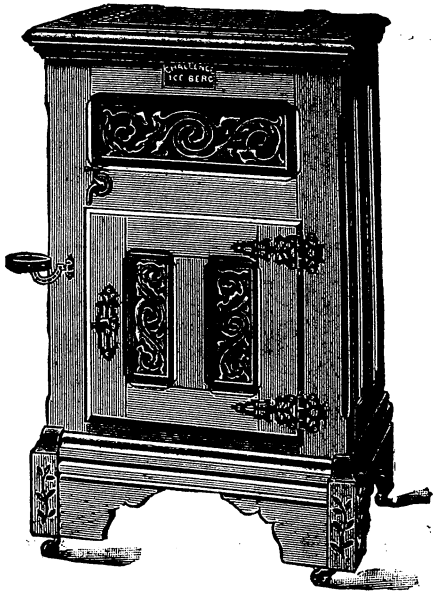
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The Largest Factory of its Kind in the World.

Write for prices, and for illustrated seventy-six page catalogue.

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THE IRON AGE STANDARD HARDWARE LISTS

FOR USE IN PRICE BOOKS.

Compiled by R. R. WILLIAMS, Hardware Editor of The Iron Age.

PRICE 25 CENTS.

This pamphlet contains the principal standard Hardware price-lists in as clear and compact an arrangement as possible, so as to permit their being advantageously cut out and inserted in the price book. In order to make them adapted to this use they are printed on thin and tough paper of fine quality and on only one side of the paper.

Saucepans and Round Boilers.

	Plain	Turned.	Turned or En'd.
Pints.			
1	\$0.30	.35	.39
1½	.32	.37	.44
2	.35	.39	.48
3	.42	.47	.56
Quarts.			
2	.50	.56	.63
2½	.53	.59	.68
3	.55	.62	.73
4	.60	.68	.84
5	.65	.75	.96
6	.70	.81	1.11
7	.75	.84	1.21
Gallons.			
2	.85	.96	1.31
2½	1.05	1.18	1.56
3	1.20	1.35	1.70

The success of the effort to give the lists in small space is illustrated in many of the lists, in which a clear and condensed arrangement is secured. For instance, the wrench list occupies but 3 inches by ¼ inch, while the list of Stove Hollow Ware, in very small space, gives the list prices on a large and important line of goods which often occupy several pages in catalogues. In several lists, such as Strap and T Hinges and Butts, a new arrangement is adopted, which is regarded as presenting these lists in a very convenient as well as condensed form.

As is obvious from the lists herewith reproduced, the shape and size of the different lists varies greatly, the aim being to give each list the smallest and most convenient arrangement possible. None of the lists are, however, more than 3½ x 6 inches in size, very few of them being as large as this and most of them very much smaller. In use it is intended that they shall be trimmed closely before they are inserted in price books, when they may be attached either by one edge close to the hinge of the book, as will, perhaps, be most convenient with the larger lists, permitting the use of the entire page for memoranda, or the smaller lists may be pasted on the page in connection with the entries in regard to discounts, freights, &c. Many of the lists are so compact in arrangement as when thus inserted to leave ample room for recording quotations.

Wrenches.

	6	8	10	12	15	18	21
Inches.							
Black...	\$9.00	\$10.00	\$12.00	\$14.00	\$24.00	\$30.00	\$36.00
Bright..	10.00	11.00	14.00	16.00	26.00	32.00	38.00

Stove Hollow Ware.

Ground and Unground.

	No.	6	7	8	9	10	11
Pots.....	\$0.65	.75	.85	1.00	1.25	1.75	
Kettles.....	.55	.65	.70	.85	1.00	1.40	
T Kettles.....	.75	.80	.90	1.00	1.25	....
Spiders.....	.27	.30	.35	.40	.50	.60	
Griddles Round	.22	.25	.27	.30	....	....
" Long..	.40	.50	.60	.75	....	....

SCOTCH AND YANKEE BOWLS.

	No.	1	2	3	4	5	6
Scotch Bowls..	\$0.35	.40	.45	.50	.60	.70	
Yankee Bowls.	.35	.45	.55	.65	.75	.90	

Glue Pots.

Tinned or Enameled

No.	4/0	4.50	No.	2	8.40
3/0	5.00	3	10.26		
2/0	5.50	4	12.42		
0	6.00	5	14.58		
1	6.75	6	16.94		

and inserted in price books, and can be used in connection with any of The Iron Age Hardware Price Books.

That the Standard Hardware Price Lists meet a want of the trade is evident from the fact that a new edition is already called for.

EVERY HARDWAREMAN SHOULD HAVE A COPY. Price 25 cts.

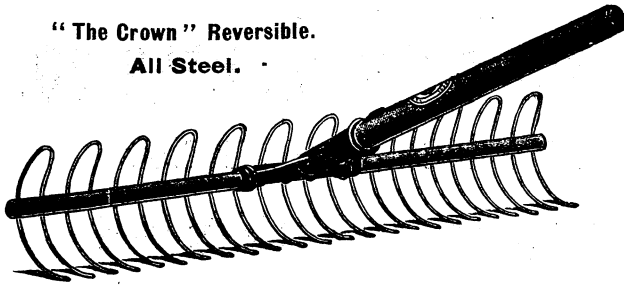
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DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade Street, N. Y.

WHEN IN THE MARKET FOR

Lawn Rakes and Post Hole Diggers

"The Crown" Reversible.
All Steel.



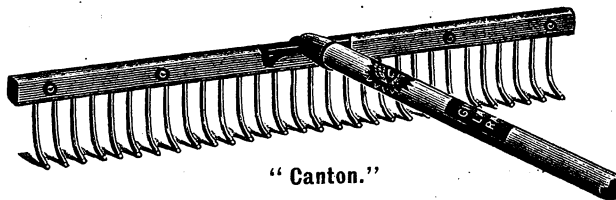
Write for Prices and Catalogue.
You will find the line we represent the largest, best and most complete made.

HANDLED BY
LEADING JOBBERS
OF HARDWARE.

Lawns are cleaned perfectly and quickly with these Rakes, requiring no picking of grass or leaves from the teeth, and do not tear the sod when raking. The teeth cannot come out, get loose nor twist.



SIX STYLES OF LAWN RAKES:
Gibbs. Canton. Crown No. 1. Acme. Crown No. 2. Favorite.



FOUR STYLES OF DIGGERS:
Gibbs. Columbia. National. Imperial.
Made in the most thorough manner of the best material and warranted.



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GENERAL AGENTS.

PURE ALUMINUM COOKING UTENSILS

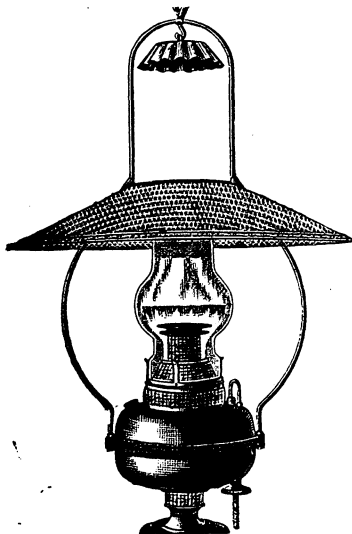
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If your dealer does not keep them, remit one dollar for a pure aluminum 2 Quart Saucepan (scrap value, 25 cents). Once tried always used, because they cannot be worn out.

ALL GAUGES OF ALUMINUM SHEET KEPT IN STOCK.

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A PHENOMENAL 320 CANDLE-POWER COAL OIL LAMP.

THE GREAT STORE, OFFICE AND FACTORY LIGHT.

Brilliantly Illuminates a room 35 feet square at the cost of about one penny per hour.

Save your gas bills. Sold at no higher price than inferior lamps. Made also in handsome designs, with library extensions, for dining rooms, halls, libraries, &c. Sold everywhere. If your dealer does not keep it, write

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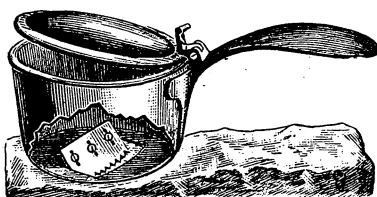
Cleveland, Ohio.

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THIRD AND DAUPHIN STREETS, PHILADELPHIA.

ICE SHREDDER,

TO SHRED OR SHAVE ICE,
For Fruits, Drinks, Oysters and
Clams on the Half Shell,
Olives, Celery, Radishes,
Iced Tea, Sliced
Tomatoes, &c.,
&c. &c.



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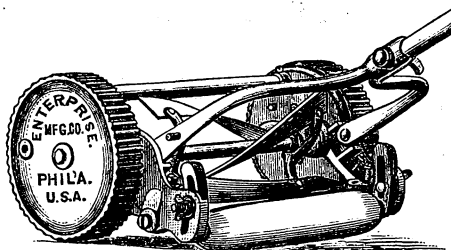
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No. 34, Nickeled,

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PAINTED or TINNED.



7, 9, 11, 13 and 15 inches.
Simple in Construction.

Easily Adjusted.

Light Running.

Highly Efficient.

Durable.

FRUIT PRESS

FOR MAKING
Wines, Jellies, Fruit
Butters, &c.



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Price, \$3.00.

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FOR SALE BY THE HARDWARE TRADE. SEND FOR CATALOGUE.

WE ARE STILL "IN IT"

—WITH THE—

EUREKA AND LEADER

Adjustable Window Screens,

—ALSO—

Sticks and Corners for Door and Window Frames.

SEND FOR CIRCULAR AND PRICE-LIST.

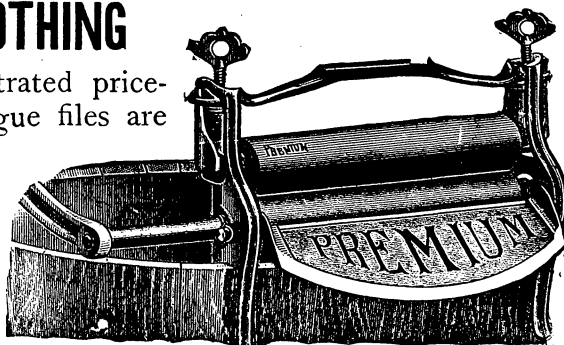
QUEEN ANNE SCREEN CO.,

JNO. H. GRAHAM & CO., Genl. Agents,
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Burlington, Vermont.

IT COSTS NOTHING

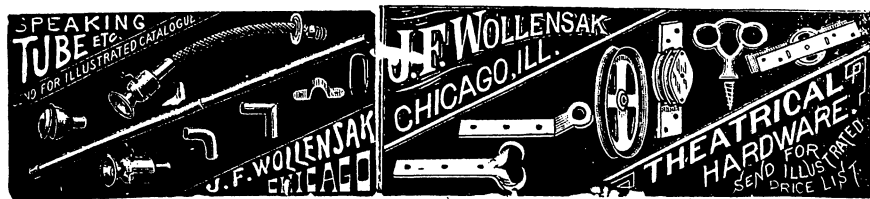
to send for our illustrated price-list, and your catalogue files are incomplete without it. Write to the Factory, Montpelier, Vt., or to our Chicago store, 68 Lake St.

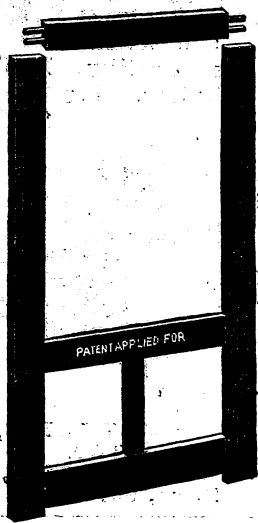
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This is a perfectly balanced Hammer with Claw of peculiar construction. When tacks driven closely to base-board are to be removed they can be extracted quickly and without injury to wood-work. They are made in two grades, No. 1 and No. 0. No. 1 grade has a magnetized head, making it unexcelled for ceiling work or for use in places where only one hand can be used to advantage. No. 0 grade is finished in same manner as No. 1, but is not magnetized. We earnestly solicit a trial of this Hammer, and would ask that you write to our nearest agent for prices. Manufactured by

SMETHPORT MACHINE COMPANY, Limited,
SMETHPORT, PA.

C. H. GURNEY CO., Western Agents, Chicago, Ill.
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Four Sizes

Of the Kelley Adjustable Screen Door Frame

WILL FIT ANY DOOR.

SEE THE POINT?

Ask Them
for it,

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The McIntosh-Huntington Co., Cleveland, O.
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NOTE THAT

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2. They are easier put together than others.
3. They are made of White Pine—nicely stained.
4. Moulding is furnished cut to length for each frame as follows: 4 pieces 2½ ft., 2 pieces 8 ft.
5. The "Kelley" is the only adjustable frame that will make as durable a screen door as the finished screen doors you buy.
6. OUR FRAME IS INTENDED TO MAKE THE ODD SIZES, but can be used for all if desired
7. Retailers can double their sales with the Kelley Adjustable Screen Door Frame.
8. Any boy can make screen door complete with wire and moulding in fifteen minutes.
9. Remember the frames are all 8 ft 6 in. high
10. Study it until you think well of it yourself and you will be astonished at the number you will be able to sell.

The **W. J. Kelley Company,**

(Main Office and Factory),

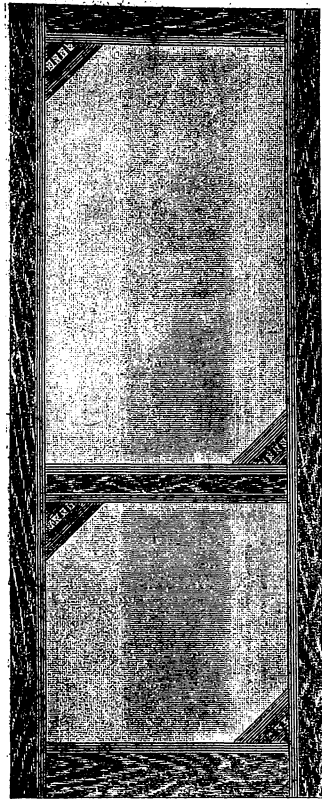
Greenville, Ohio, U. S. A.

Chicago Office, 945 Rookery.

Or about it.

The New Empire Fancy Screen Door.

Pine, natural color, filled and varnished. First-class in every particular. Retail for \$1.50 and can be sold for \$1.25.



We are makers of

Phillips' Screen Doors,

3 or 4 Panel, $\frac{1}{2}$ or $1\frac{1}{2}$ thick, Painted or Stained.

Phillips' Fancy Screen Doors. The finest of material and work.

Bonanza, Perfection, Extension

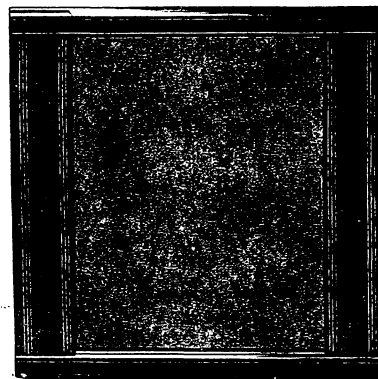
WINDOW SCREENS

in a great variety of sizes and finishes; with or without spring adjustment.

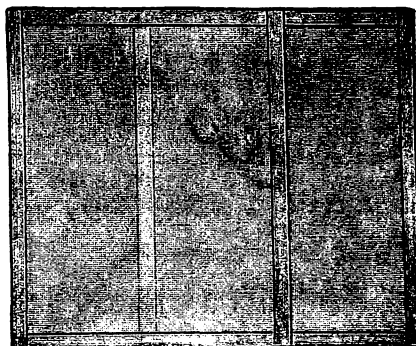
PHILLIPS' WINDOW SCREEN FRAMES.

The simplest, strongest and best.

Phillips' Goods are guaranteed to be well made from good materials.



BONANZA.



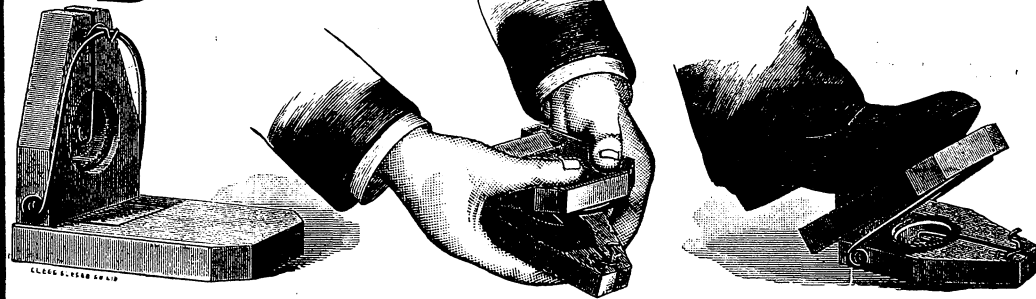
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The Phillips factories turn out an average of 4000 screens per day. The present output is 5000 per day.

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BEST AND SIMPLEST TRAP IN THE WORLD.



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For
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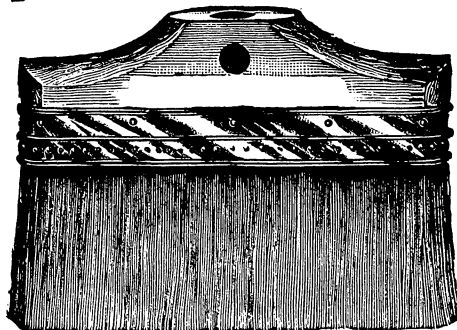
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Catches Dollars for the Seller and Rats for the Buyer.

Don't handle infringements.

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Whitewash Brushes.



HORSE, SHOE, WINDOW,
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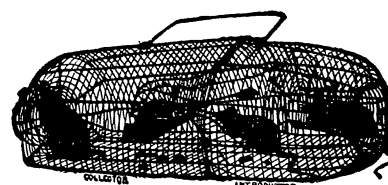
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GENUINE MARTY RAT AND
MOUSE TRAPS
ALWAYS IN STOCK.



THEY DO THE WORK.
Orders solicited. Prices on application.
BURDITT & WILLIAMS,
20 Dock Square, Boston, Mass.
— SOLE AGENTS AND IMPORTERS. —

No. 4 RATTAN MIXED BROOM.

The Best Warehouse, Stable, Shop, Factory and Railroad Broom in the Market.

Made of Broom Corn and Rattan Reed mixed together, flat in shape, with an iron band, as shown in the cut, making it solid, substantial, and stiff, for handling the heaviest dirt. Will last longer than any other similar broom.

Brooms and Brushes for Railroad Shops, Warehouses, Street, Stable, Bloom, Chill, Casting and Moulding purposes a specialty. Write for prices.

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The Boss Washing Mch.

An Entirely New Invention. Double acting, working with two cylinders in opposite directions. The greatest saver of household labor ever invented.

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A Fair Trial will convince the most skeptical of its superiority over all other Washing Machines, Thousands in use.

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Circulars Free. Made by
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Manufacturers of

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Metal Goods.

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Factory, 103 to 119 N. 3d St., Brooklyn, E. D., N. Y.

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LADDERS.

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LAWN SWINGS,

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Catalogue Furnished.

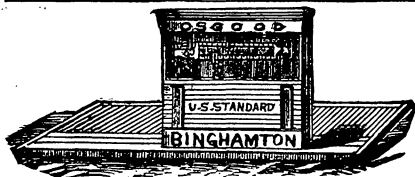
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COMMON MOUSE TRAPS BEST FOR USE!

Ripley Mfg. Co., Unionville, Conn.



Porcelain-Lined Lemon Squeez-
ers, Steak Hammers, Boot Jacks
Magnetic Tack Hammers, Mal-
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Beacon Hill Pat. Mouse Traps,
Sunny-Side 2 lb. Lap Board



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Lowest Prices
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All goods
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first-class.

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New York.

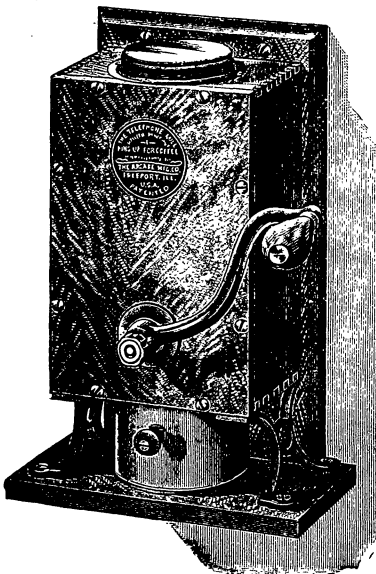
Men Don't Wash



Clothes usually ; so we've made
a machine that won't tire women,
who generally do this sort of
thing ; besides it washes clean
and don't tear. Dealers who
try "The Anthony Wayne"
readily perceive its merits over
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Write for or order sample
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THE ANTHONY WAYNE MFG. CO.,
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Arcade Manufacturing Co.

MANUFACTURERS OF THE

"TELEPHONE"

AND OTHER HIGH-GRADE FAMILY

COFFEE MILLS.

The "TELEPHONE MILL," for grinding Coffee
or Spices, is made of hard wood, highly finished
and nickel trimmed. The only boxed mill
which can be fastened on table, shelf or wall—
holds a pound of coffee—self-feeding, and
easily regulated to pulverize.

We also Manufacture the Celebrated

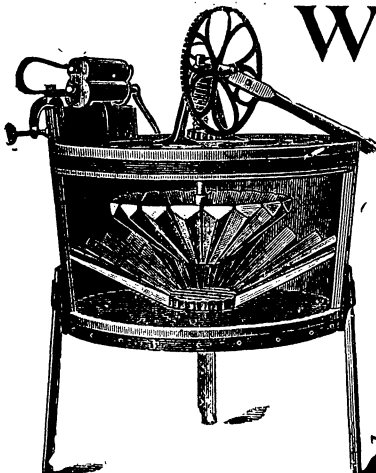
ARCADE SCREEN DOOR HINGES

And Other Hardware Specialties.

Send for Prices and Catalogues.
EAST FREEPORT, ILL.

NEW YORK AGENTS, J. C. McCarty & Co.,
97 Chambers St.

Washing Clean

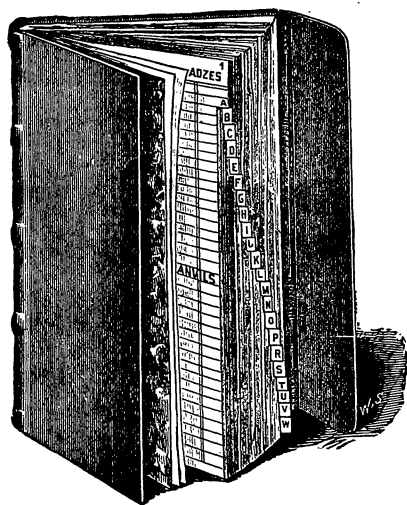


Clothes is an easy task,
but for downright dirty
linen "THE WEISELL"
washer is what live deal-
ers sell. Do you?

"IT DOES CLEAN WORK."

DIETHER & BARROWS,
Ft. Wayne, Ind.

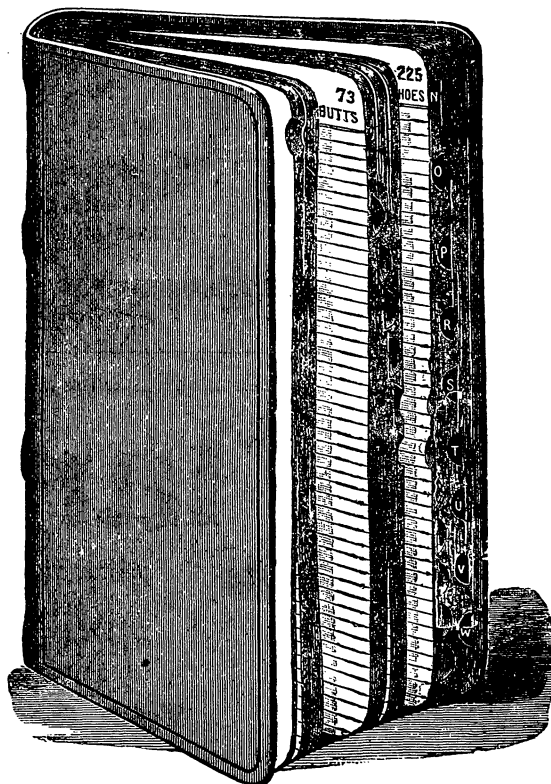
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(POCKET EDITION.)

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Flexible Leather, with flap. Price, \$4.00.



500 Pages. 6 x 9 inches.

Flexible Leather, for Office or Store Use.

Price, \$8.00.

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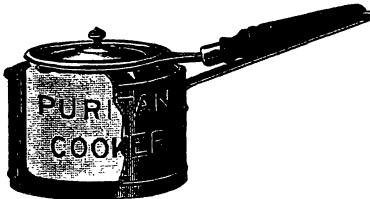
No attempt has been made to include every article kept in any one hardware store. Assortments are so varied that no one book could be made to fit two stocks. At the same time, a very large proportion of the goods in any general hardware store are duplicated in any other similar store. The plan of this book is to arrange such goods as are regular and common to all stocks in complete alphabetical order, printing the name of each article and allowing sufficient room to add lists, weights, cost and selling prices, and such other information as the owner may desire to record. Sizes and numbers that are permanent are printed, and in some cases descriptions and comparative numbers. Experience proves that too much printing is a disadvantage, but enough to locate staple goods and make a basis to work from is a decided help. In this judicious arrangement of printing and spacing these books prove their value. The drudgery of laying out and writing in headings is done away with, and the buyer commences at once to add prices in the spaces already determined for him.

The large size is recommended for office or store use. The small book is the same in all essential points as the large one, but is made on a smaller scale for convenience of those who require a book for the pocket.

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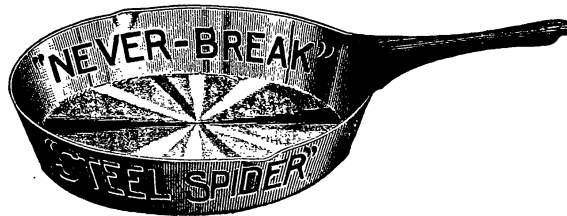
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"PURITAN"COOKERS, COFFEE POTS AND
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Porcelain Rice Boiler made.**"NEVER-BREAK"**

Wrought Steel Spiders

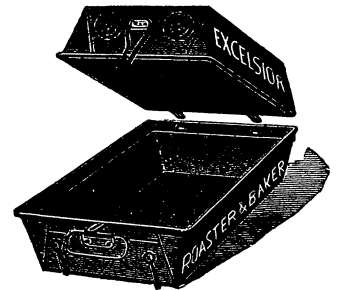
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MIRROR POLISHED—TINNED—PORCELAINED.



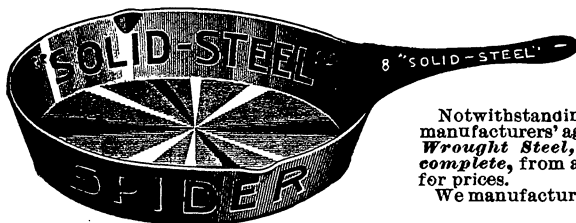
"MIRROR POLISH," the only Perfect Plain Steel Finish.

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PLAINISHED and PLAIN STEEL.**Many Dealers**prefer to sell cheap goods, thinking it is less trouble, never
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after all. Only the best can be considered cheap. You will
find **The Peerless Freezers** such if quality and price
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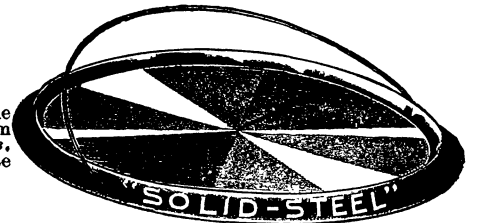
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"SOLID-STEEL" SEAMLESS HOLLOW WARE.

No Seams, no Rivets in "Solid-Steel" Ware.

BRILLIANT FINISH.

Notwithstanding the claims made by some
manufacturers' agents, our spiders are made from
Wrought Steel, Without Seams or Rivets,
complete, from a single piece of metal. Write
for prices.
We manufacture our own goods.

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We are in shape to figure on light and heavy stamping, and in addition to the above we build Dies and Stamping Machinery.

**THE HENRY 4 Piece Sifter**for sifting flour or straining purposes. This is an
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MANUFACTURERS OF

BUILDERS' AND SHELF HARDWARE
OF ALL KINDS.

HARDWARE FOR Window AND Door Screens.

"VASSAR" CYLINDER LOCKS.

FINE HAND MADE

Communicating Door Locks.

Artistic Designs in Genuine Bronze House Trimmings,
For Fine Residences and Public Buildings

INCLUDING

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"ELAINE,"

"FLUTED"-(SQUARE END), "COLUMBIAN,"

"FLUTED"-(CIRCULAR), "AMERICUS,"

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"LAGRANDE,"

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Our new patterns and designs can be furnished in more than **20** Finishes.

—ALSO IN—

RUST-PROOF IRON

NEW IMPROVED

"VASSAR" Rim Night Latches,
And "VASSAR" Rim Dead Locks

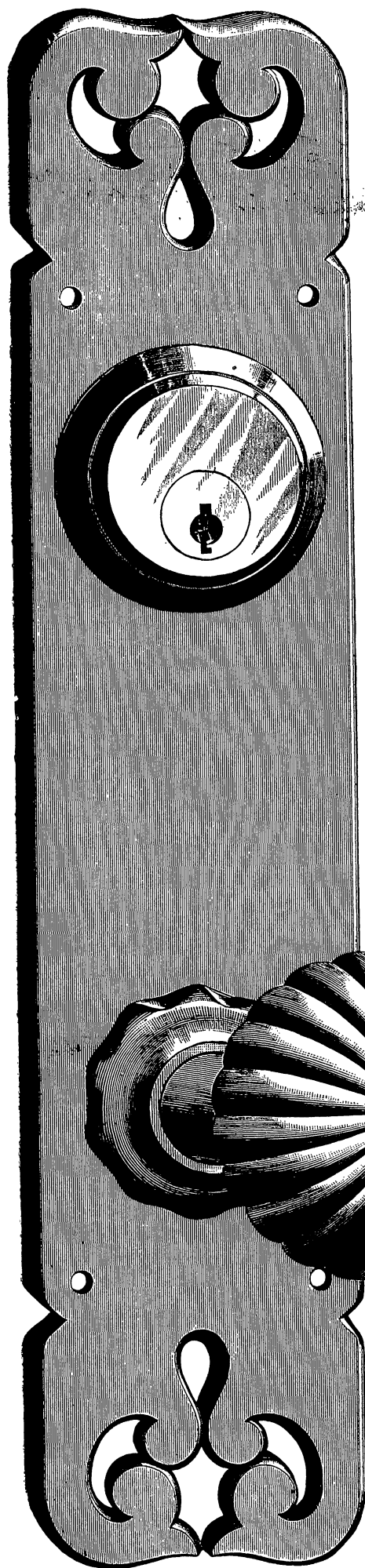
are now made with our Patent Self Adjusting Connecting Spindle, which does not have to be cut off or filed. It adjusts itself.

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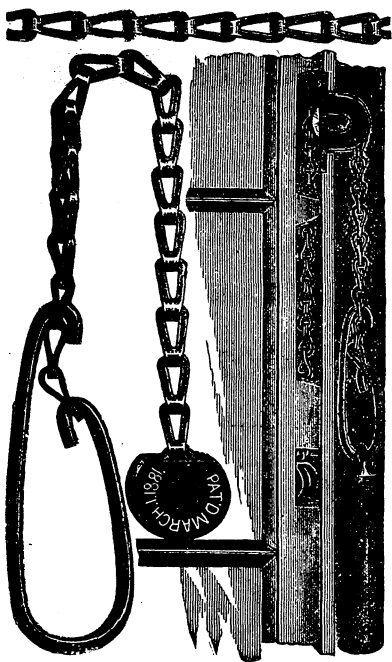
Reading Hardware Co., Reading, Pa.



COLONIAL PATTERN.

THE SMITH & ECCE MFG. CO.

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**THE GIANT PAD LOCK.**

Centennial Award. "Superior in Every Respect"
This is one of the best selling locks in the market, and affords the dealer a large profit. It is thoroughly and strongly made—of the best material—very handsome in appearance, and every Lock is warranted. Orders solicited.

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Will wash the dirtiest clothes clean, without tearing, waste of time or energy. Any child can operate it as easily as a grown person, with the same result—cleanliness, rapidity and perfect work. Conceded by all dealers who've handled them to be

THE BEST.

Send for a sample machine and obtain our bottom prices.

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SIDNEY, OHIO.

ESTABLISHED 1865.

J. H. Sternbergh & Son,

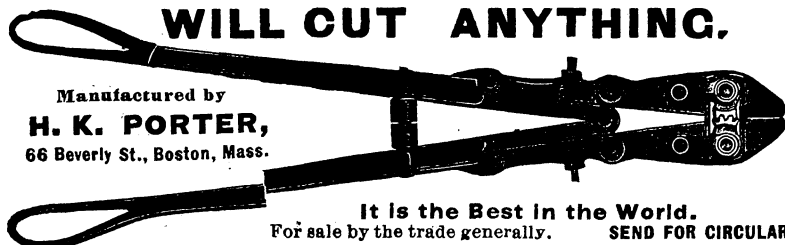
READING,
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MANUFACTURERS OF
BOLTS, NUTS, WASHERS, RIVETS,

Including Machine Bolts, Carriage Bolts, Bridge Bolts and Car Bolts,

THE HARVEY PATENT GRIP-THREAD TRACK BOLT, Soft Steel Bolts with Cold Rolled Thread, Bolt Ends, Turnbuckles, Sleeve Nuts, Lag Screws, Set Screws and Tap Bolts and every variety of screwed work.

BOILER, BRIDGE AND SHIP RIVETS, Square and Hexagon Nuts of all kinds and sizes, Plate Washers, Belt Lacing Machines, Rods and Irons for Bridges and Buildings, Merchant Bar Iron, etc., etc.
Branch Establishment, **THE KANSAS CITY BOLT & NUT CO.,** Kansas City, Mo.

THE "EASY" BOLT CLIPPER.
WILL CUT ANYTHING.

Manufactured by
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66 Beverly St., Boston, Mass.

It is the Best in the World.
For sale by the trade generally. **SEND FOR CIRCULAR.**

23,000 Sold.

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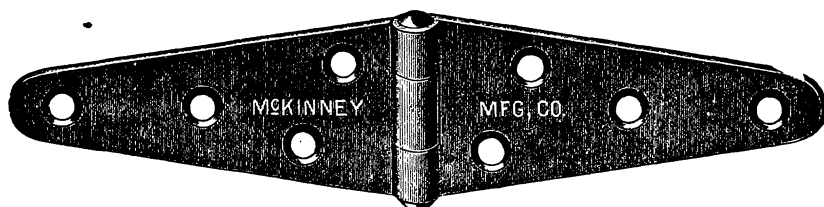
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STEEL HINGES AND BUTTS

EXCLUSIVELY.

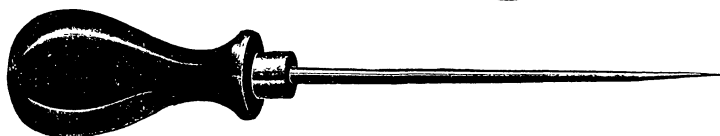
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"NONE BETTER."

ICE PICKS



The "Copeland Pick."

Polished Jet Handles.

Superior in Every Way.

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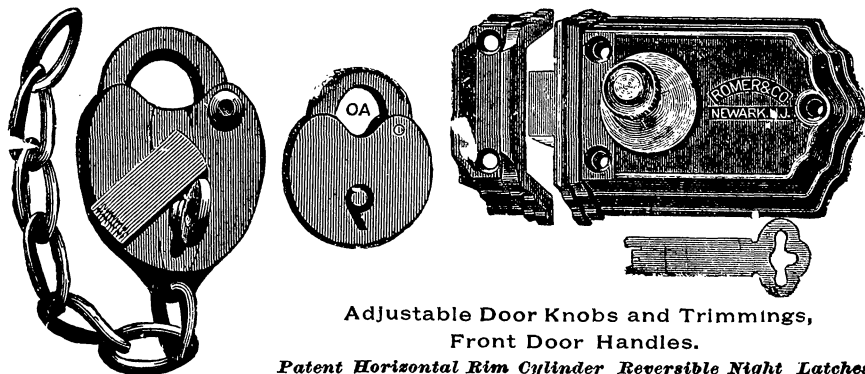
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The Copeland Hardware Mfg. Co.

WORCESTER, MASS.

ROMER & COMPANY, Manufacturers of PATENT
JAIL LOCKS, BRASS and IRON PADLOCKS,



Adjustable Door Knobs and Trimmings,
Front Door Handles.

Patent Horizontal Rim Cylinder Reversible Night Latches.

Illustrated Lists sent to the Trade on application.

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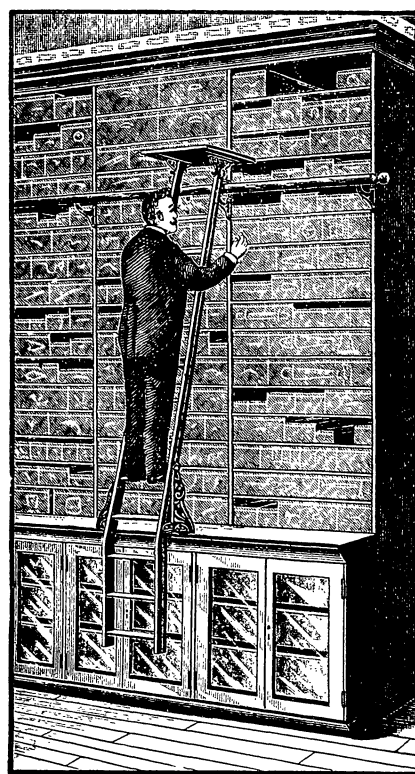
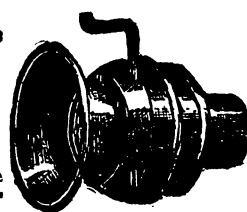
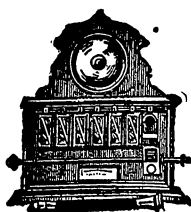
W. R. OSTRANDER & CO.,

195 and 197 FULTON ST., NEW YORK,

Manufacturers of

SPEAKING TUBES, WHISTLES, ORAL, ELECTRIC, MECHANICAL & PNEUMATIC ANNUNCIATORS & BELLS.

Complete Outfits of Speaking Tubes, Whistles Electric, Mechanical and Pneumatic Bells. A full line always in stock. Send for new catalogue. Factory, 363 1/2 Ave. C, near Knickerbocker, Brooklyn, N. Y.

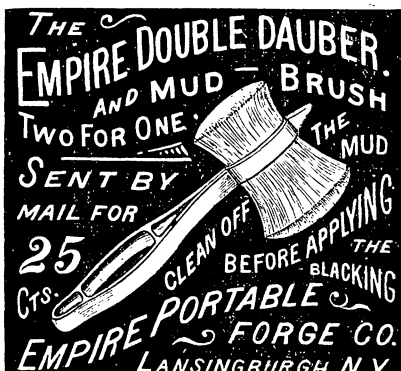


THE BICYCLE STEP LADDER

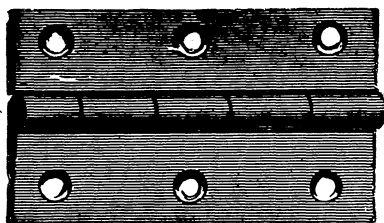
The Newest, Neatest, Simplest, Easiest Operated and Safest Store Ladder made. Ladders are not Suspended, but Supported from below on wheels. Move easier with operator on than others when empty. Highly finished, and very handsome. Made in different grades and prices to suit. Send for illustrated catalogue and prices to

The Bicycle Step Ladder Co.,

184 and 186 Clark St., Chicago, Ill.



N. Y. Office, 103 Chambers St., W. H. QUINN, Manager



Cast Brass Butt Hinges

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W. & J. TIEBOUT

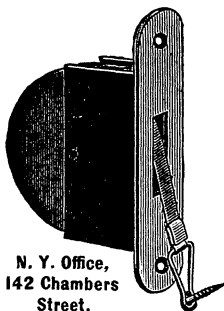
Nos. 16 & 18 Chambers Street, New York.

MANUFACTURERS OF

**BRASS, GALVANIZED & SHIP CHANDLERY
HARDWARE.**

A WONDERFUL INVENTION OF Phenomenal Popularity.

This is not a Complicated Combination of Steel Ribbon, Pulleys, Attachments and Weights. Our Balance costs the consumer half the



N. Y. Office,
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Street.

money and lasts twice as long. Requires no Box Frames. Can be applied to old as well as new windows, exactly counterbalancing the weight of the sash.

Steel Frame, Aluminum Tape. Practically indestructible.

Every Balance warranted.

Ask for Pullman and don't confuse ours with imitations.

THE PULLMAN SASH BALANCE CO., Rochester, N. Y.

COMMON SENSE SASH BALANCE.

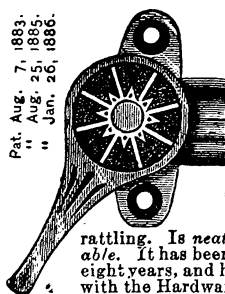


The Best and most Practical substitute for weights invented. The most Durable, the Cheapest and best device for all ordinary windows. Balances when in position are out of sight. No rivets, bolts or screws are used in putting it together, so that nothing can get out of order or need repairing. No cutting, boring or marring the sash, as the Balances are let into the jamb.

Manufacturers of Sash Balances, Sash Locks, Sash Lifts, Monitor Sash Irons.

STEWART & BAKER,

197 State Street, Rochester, N. Y.



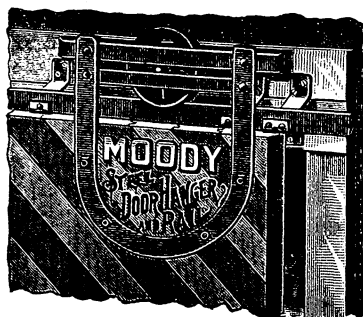
The Champion SIDE Sash Lock

Has by its unequalled merits gained the public favor. It is a safe ventilator and prevents rattling. Is neat, cheap, simple and durable. It has been in extensive use for over eight years, and has become a staple article with the Hardware trade.

Beware of Worthless Imitations.

THE CHAMPION SAFETY LOCK CO.,
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VICTOR MFG. CO., Newburyport, Mass. STEEL RAIL.



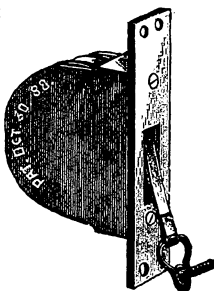
Showing one-half set of hangers attached to door.



The Only Bracing Bracket Made.

PRICE-LIST.

HANGERS.	Per Doz. prs.
No. 5, to run 6 feet, 3 1/2 in. wheel,	\$10.00
No. 6, to run 10 feet, 4 1/2 in. wheel,	15.00
No. 7, to run 15 feet, 5 1/2 in. wheel,	22.00
RAIL, per foot.....	6 1/2 cents.



Merit Always Wins. THE CALDWELL SASH BALANCE

Has been the standard for five years.

Write for our new catalogue of Hardware Specialties.

CALDWELL MFG. CO., Rochester, N. Y.

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73 Wabash Ave., Chicago.

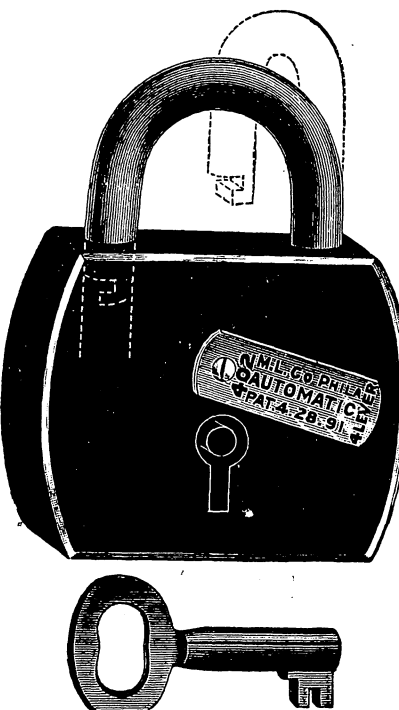
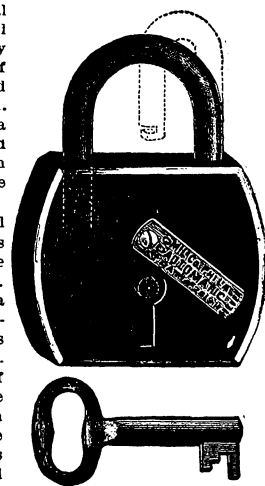
NEW PATENT 4-LEVER

Automatic Padlock.

Our recommendation of the "AUTOMATIC" Padlock as one that would claim a prominent place in the market has been fully warranted by the universal satisfaction it has given.

We now, with equal emphasis, recommend the smaller size. Every part is well made, of the best materials, and the finish is excellent. These Locks are of a design, weight and size that adapt them to an unusually wide range of service.

The cuts show full size. The larger weighs full 4 ounces; the smaller full 1 ounce. The 4 Levers afford a degree of security unprecedented in locks of such moderate price. Over 200 changes of key are available in the larger, and over 100 in the smaller lock. The automatic action is pleasing, oval and convenient.



When made special, to pass a sample key, also when made with keys alike to pass, and as well when more than 50 changes are required in a set, the price per dozen locks is advanced 50 cents net.

No. 402, Steel, dark finish, 2-keyed,	Per Dozen, \$8.67
" 402B, Brass, bright finish, 2-keyed,	" 8.00
" 400, " Nickel plated, 1-keyed,	" 6.60
" 398, " Bright finish, 1-keyed,	" 6.00

For Sale by Best Jobbing Houses and by all Live Retailers.

MILLER LOCK CO., Lock Manufacturers, PHILADELPHIA, PA.

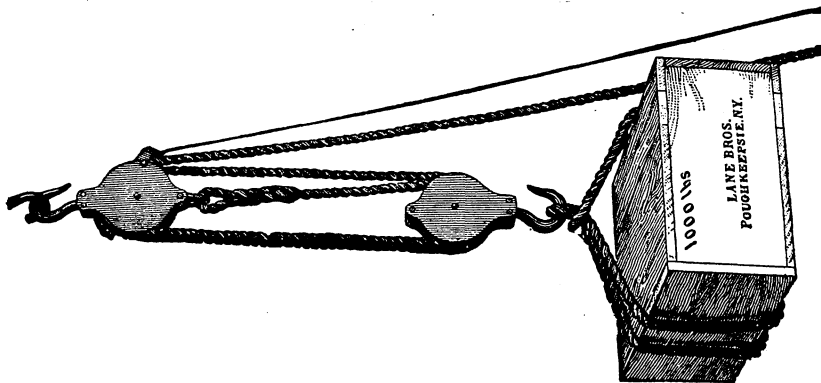


THE CLARK MFG. CO.,

Blind Hinges, Gate Hinges, Door Butts,

And other **HARDWARE SPECIALTIES,**

BUFFALO N. Y.



LANE'S SELF-LOCKING TACKLE BLOCKS,

Anti-Friction Steel Bushings,

Holds the load at any point, and always sure.

SEND FOR CIRCULAR.

For sale by the Hardware trade.

—MANUFACTURED BY—

LANE BROS.
POUGHKEEPSIE, N. Y.

PATENT PERFECTION PADLOCK

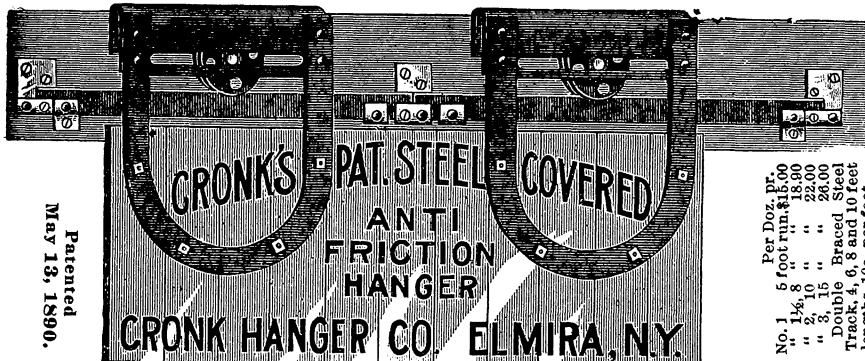
Eight Tumblers. Key Turning Both Ways.



Sizes; $\frac{1}{4}$ inch to $2\frac{1}{2}$ inches; of cast bronze. Defies competition for quality and price. No steel or iron used, cannot rust, and cannot be picked. Also, $\frac{1}{2}$ and $\frac{3}{4}$ inch Padlocks, opened with a common pin, in brass and nickel; for cats and small dogs. The best Railroad Switch and Car Lock in the world. Adopted by the United States Treasury for bonded warehouses.

AMES SWORD CO., Chicopee, Mass.

Send for Price Lists and Circulars.



Patented
May 13, 1890.

Per Doz. pr.
No. 1 5 foot run \$15.00
" 1 1/2 8 " 18.00
" 2 10 " 22.00
" 3 12 " 24.00
" 4 14 " 26.00
" 5 16 " 28.00
Double Braced Steel
Track, 4, 6, 8 and 10 feet
lengths, 10c. per foot.

We are the original makers of steel covered hangers and all others are imitations. Beware of infringements, as we shall protect our rights.

In our Steel Covered Hangers we have all the desirable features of the Best Hangers in the market, and with that we combine the cover for wheels SO NO ICE OR SNOW can reach the wheels, and making this cover as we do, we stiffen it so it is the strongest Hanger in the market, and we believe it is just perfect. Would be glad to have you try a small order and satisfy yourself.

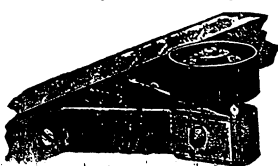


Double-Braced Steel Rail.

PATENTED JUNE 12, 1888.

This rail being double-braced and double-riveted is the strongest rail in the market. Being braced both ways it will not sag. The joint is made so it is perfectly solid. It comes complete and ready for use, requiring only screws and screw driver for any man or boy to put it up in short order. It can be used for any grooved wheel Hanger, and a heavy door will not make it spring or tremble. Guaranteed to hold a door weighing 2,000 pounds, and used in connection with our Anti-Friction Hanger will work perfectly on large or small doors.

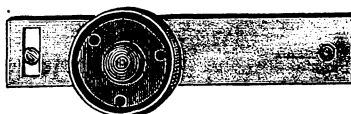
Cronk's Adjustable Stay Roller.



Made of wrought steel strap; cast block with slot adjusted by loosening bolt.

Pacific Coast Agents, CHAS. L. PIERCE & CO., San Francisco, Cal.

Cronk's Inside Adjustable Stay.



Is cheap, simple and durable, and much better than a cleat nailed on the floor, for this avoids all friction and leaves no place for dirt to accumulate. \$2.00 per doz. No inside door can be properly hung without this stay.

Crown and Giant Sash Cord and Bell Cord. Braided and Twisted Picture Wire Spool Wire, Clothes Lines, Ventilator Cords, Garden Lines, Chalk Lines, Annunciator Wire.

✻ Send for Catalogue, Samples, Prices. ✻

Bright Wire Goods, Picture Nails, Knobs, Hooks, Chain, Clothes Line Pulleys, etc.

—MANUFACTURED BY—

OSSAWAN MILLS CO., Norwich, Conn.

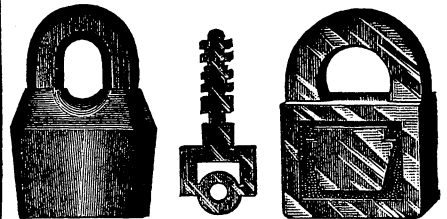
BOOKS. YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing DAVID WILLIAMS Publisher and Bookseller, 96-102 Reade Street, New York.

KEYSTONE LOCK WORKS,

—Established 1870.—

E. T. FRAIM, Lancaster, Pa., U. S. A.

MANUFACTURERS OF



Patent Inter-Locking Tumbler Scandinavian or Jail PADLOCKS, in 56 grades and sizes. Key and Self-Locking. Brass, Bronze, Steel and Malleable Iron. Red, Black, Bower-Barff and Bright Brown finish. Also a full line of fine flat padlocks in Bronze and Steel. All fully described and illustrated in our new catalogue, furnished free to the trade.

SURPLESS, DUNN & ALDER,

General Agents, 97 Chambers St. New York.

HARDWARE DEALERS

CAN RECOMMEND THE

CHAMPION METAL WINDOW SASH CHAINS

to their customers as a reliable substitute for Sash Cords, very strong and lasting (some in daily use ten years), and gives thorough satisfaction wherever used. The patented attachments are very simple and can be applied to any window.

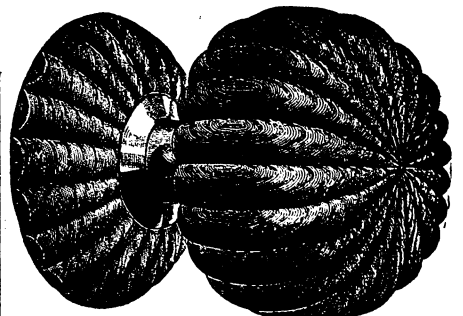
MANUFACTURED ONLY BY

"THOMAS MORTON"

65 Elizabeth Street,

Write for Prices.

NEW YORK.



**WOOD DOOR KNOBS,
DOOR SPRINGS AND CHECKS
AND CHECKING SPRING HINGES.
NEW GOODS. NEW PRICES.**

Send for New Price-List.

J. BARDSEY, 149 & 151 Baxter St. New York.

SASH WEIGHTS

E. E. BROWN & CO.,

McKean and Meadow Sts.,

PHILADELPHIA, PA.

AMERICAN CURRY COMB CO.,

TROY, N. Y., U. S. A.

MANUFACTURERS OF ALL KINDS OF

CURRY COMBS IN STEEL, BRASS AND IRON.

VERY BEST QUALITY AND FINISH.

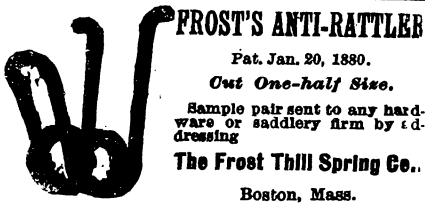
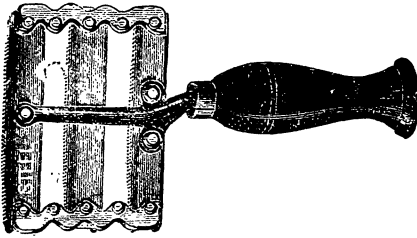
New York Sales-
rooms with

FULLER BROS., No. 33 Chambers St.

San Francisco, Cal., Salesroom with
The GEO. F. EBERHARD CO., 23 Davis St.

Portland, Oregon, Salesroom with
The GEO. F. EBERHARD CO., 23 Front St.

Illustrated Catalogue and Prices to Jobbers on Application.



FROST'S ANTI-RATTLE

Pat. Jan. 20, 1880.

Out One-half Size.

Sample pair sent to any hardware or saddlery firm by addressing

The Frost Thill Spring Co.,

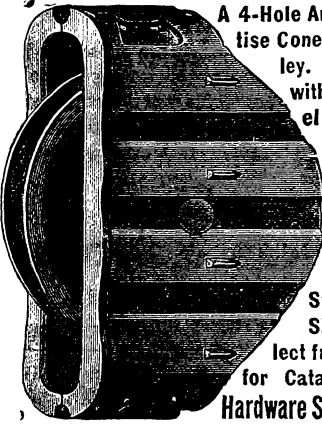
Boston, Mass.

THE WILCOX & HOWE COMPANY,
BIRMINGHAM, CONN.,
MANUFACTURERS OF

A Full Line of Carriage Hardware
ALSO SPECIAL FORGINGS.

Estimates cheerfully given. Send for Catalogue.

IDEAL SASH PULLEY.



A 4-Hole Auger Mortise Cone Axle Pulley. Applied without chisel or Screws Each
• Pulley its own marking gauge. A variety of Styles and Sizes to Select from. Ask for Catalogue of Hardware Specialties

STOVER MFG. CO.
145 River St., Freeport, Ill.

No more **Slamming!**
...Doors!

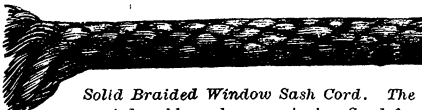
Our Combination

Door Check
Lock and
Bumpers

Holds door in any position

For sale by all Jobbers. Write for Circulars.

Unity Door Check Co.,
81 Dearborn St., Chicago, Ill.

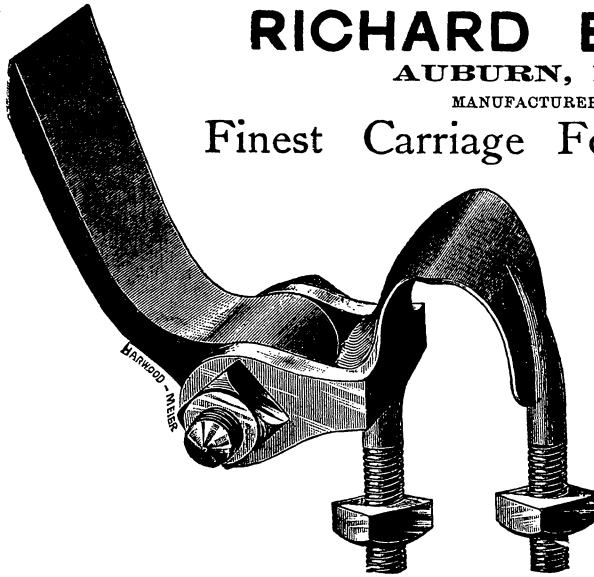


Solid Braided Window Sash Cord. The most durable and economical. Send for Samples to the Manufacturers,

Samson Cordage Works,
115 Congress Street, BOSTON, MASS.

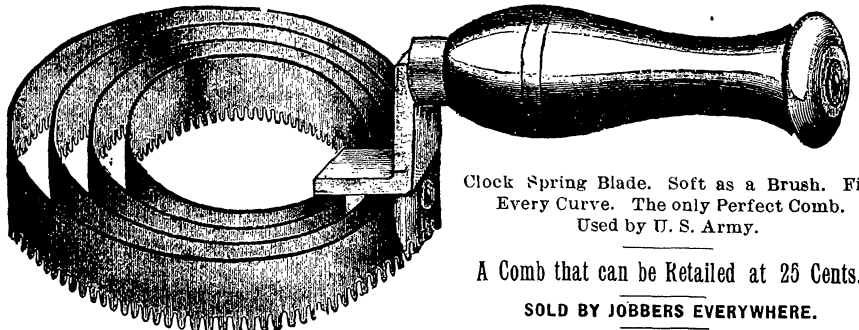
RICHARD ECCLES,
AUBURN, N. Y.,
MANUFACTURER OF

Finest Carriage Forgings, Couplings, Clips, King Bolts, Fifth Wheels, &c. Manufacture a full line. Special Drop Forgings.



Send for Catalogue.

The Spring Curry Comb.



Clock Spring Blade. Soft as a Brush. Fits Every Curve. The only Perfect Comb. Used by U. S. Army.

A Comb that can be Retailed at 25 Cents.

SOLD BY JOBBERS EVERYWHERE.

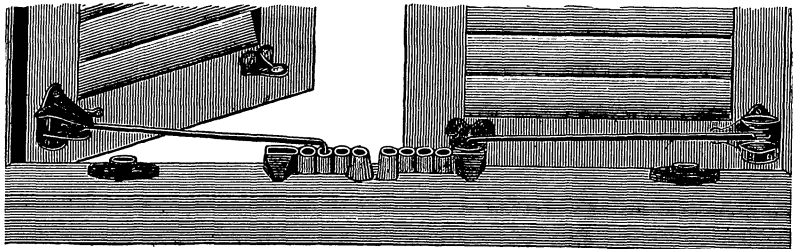
Manufactured by the

SPRING CURRY COMB CO.,

117 to 119 S. Lafayette St., SOUTH BEND, IND.

Zimmerman's Original Steel Bar Blind Fastener.

Adopted by the Leading Architects of the Country.
Beware of infringements.



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SARGENT & CO.,
BIDDLE HDW. CO.,
W. H. COLE & SONS,
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PHILADELPHIA.
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SIMMONS HDW. CO.,

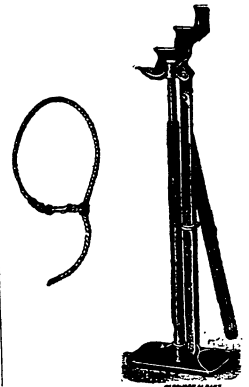
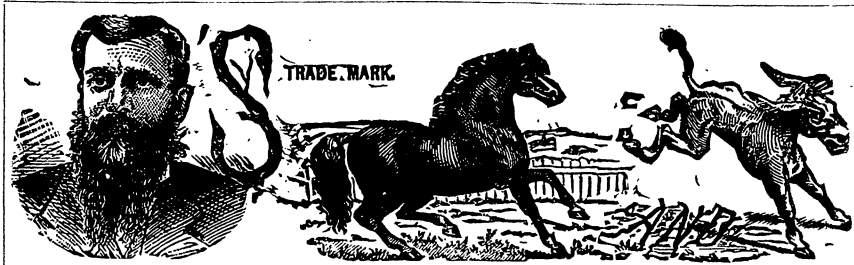
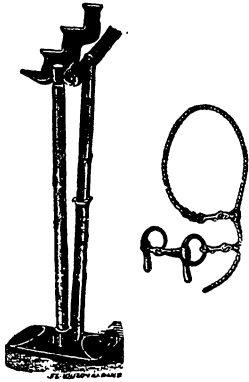
JOS. WOODWELL & CO.,
J. B. SCHROEDER & CO.,
ORR & LOCKETT HDW. CO.,

W. BINGHAM CO.,
W. B. BELKNAP & CO.,
AUSTIN & EDDY,
ST. LOUIS.

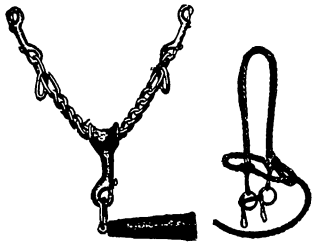
PITTSBURGH.
CINCINNATI.
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CLEVELAND.
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BOSTON.

COVERT MFG. CO.

West Troy, N. Y.

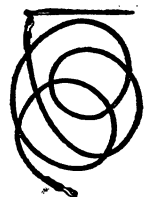
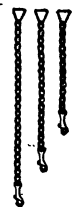
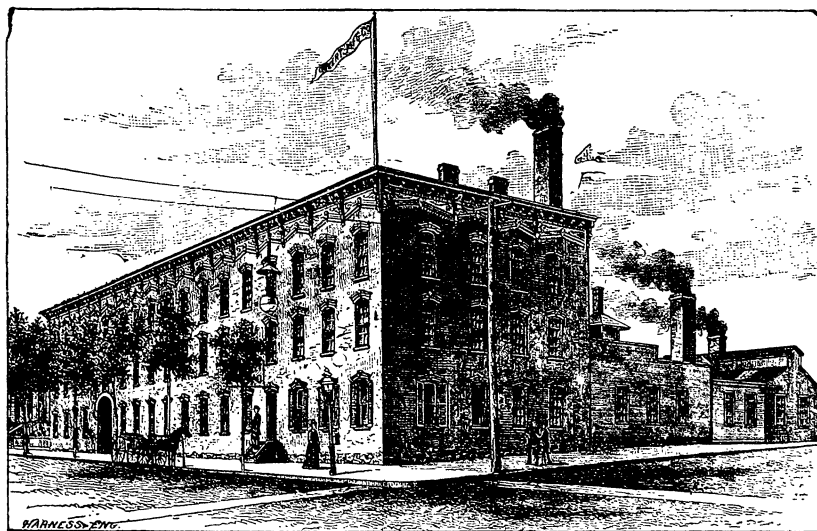
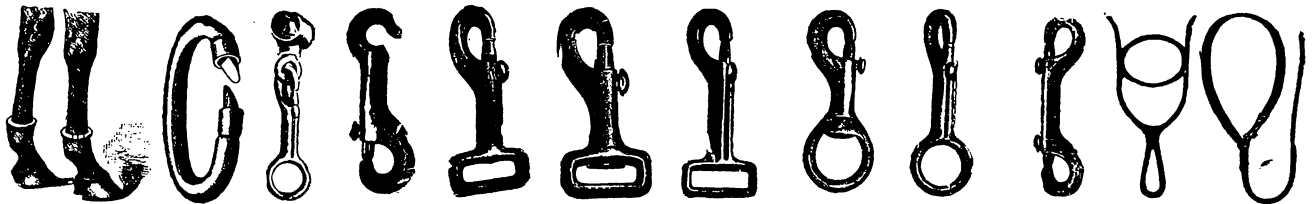
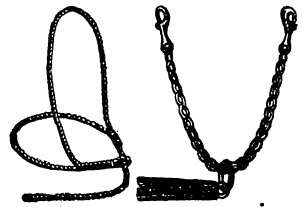


All Tags and Labels on Covert Goods bear the above Trade-Mark.



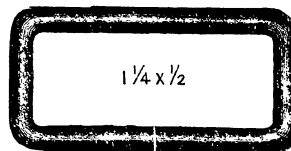
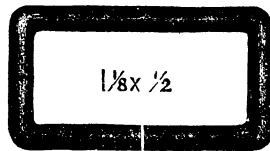
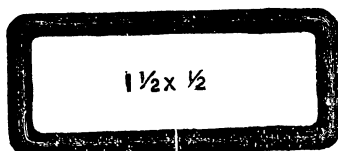
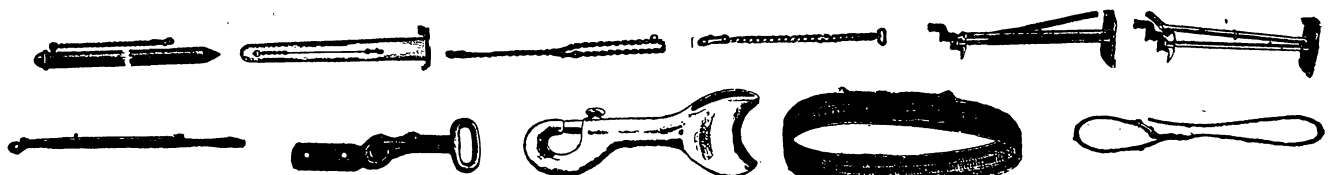
COVERT'S

Horse and Mule Jewelry.



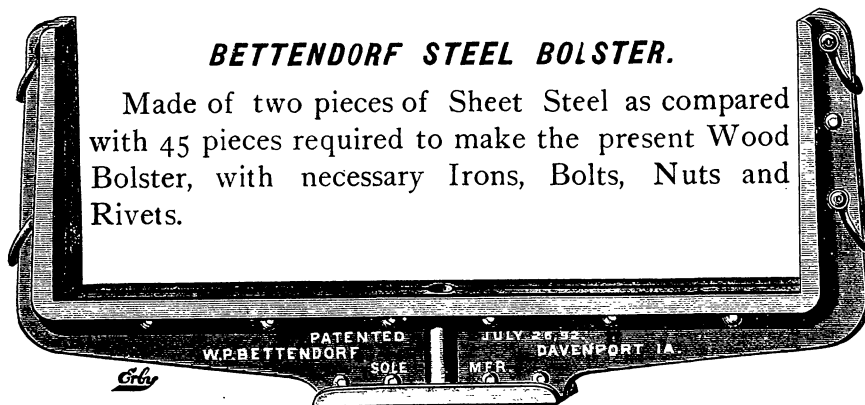
COVERT'S CELEBRATED HARNESS SNAPS, CHAIN GOODS, ROPE AND WEB GOODS ARE SOLD BY ALL LEADING JOBBERS AT MANUFACTURERS' PRICES.

COVERT MFG. CO., West Troy, N. Y.



DETTENDORF HOLLOWSTEEL WAGON AXLES, BOLSTERS AND STAKES.

25 %
Less in weight
than wood
axles of equal
strength.



BETTENDORF STEEL BOLSTER.

Made of two pieces of Sheet Steel as compared with 45 pieces required to make the present Wood Bolster, with necessary Irons, Bolts, Nuts and Rivets.

GUARANTEE.

Every axle and bolster warranted.

Any axle broken will be replaced free of charge.

FRONT AXLE AND SAND BOARD.

Steel Axle and
Sand Board, 2
Pieces.



Present Wood
Axle and Sand
Board, 14 pieces.

BETTENDORF COMBINED STAKES, BOLSTER AND SELF-OILING HOLLOWSTEEL AXLE.

Correspondence solicited with wagon manufacturers and hardware jobbers in the United States, Canada and foreign countries.

Steel, 2 Pieces. Wood, 49 Pieces.

No Bolts, Nuts or Rivets used in the construction of Hollowsteel Axles, Bolsters and Stakes



Patented in the United States, Canada, Great Britain, France, Germany, Belgium, Austria and Hungary by

W. P. BETTENDORF,
inventor and owner.

Diameter and length of Axle Bearings same as Trade Skeins of same size, and are self-oiling. For descriptive catalogue and price-list apply to

BETTENDORF HOLLOWSTEEL AXLE WORKS, DAVENPORT, IOWA, U. S. A.

TEMPORA MUTANTUR ET NOS MUTAMUR IN ILLIS.

Russell & Erwin Mfg Co.,

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PHILADELPHIA,

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LONDON.

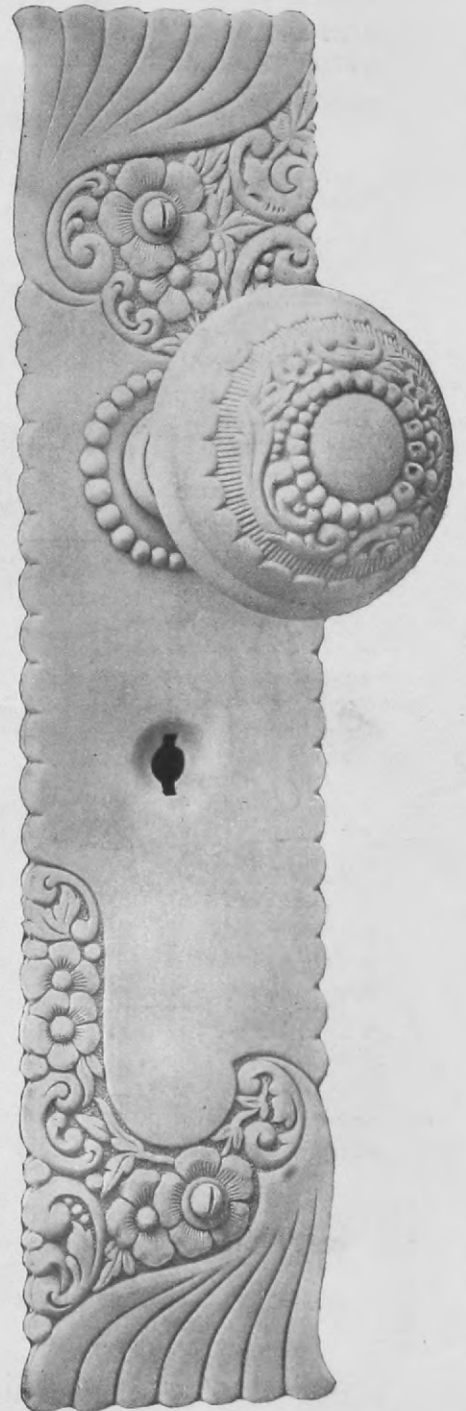


Store Door Handle and Lock
No. R 1068.

SIZE OF PLATE 18 x 4 1-4.



Embossed Bronze Metal
Sliding Door
Escutcheon No. 639.

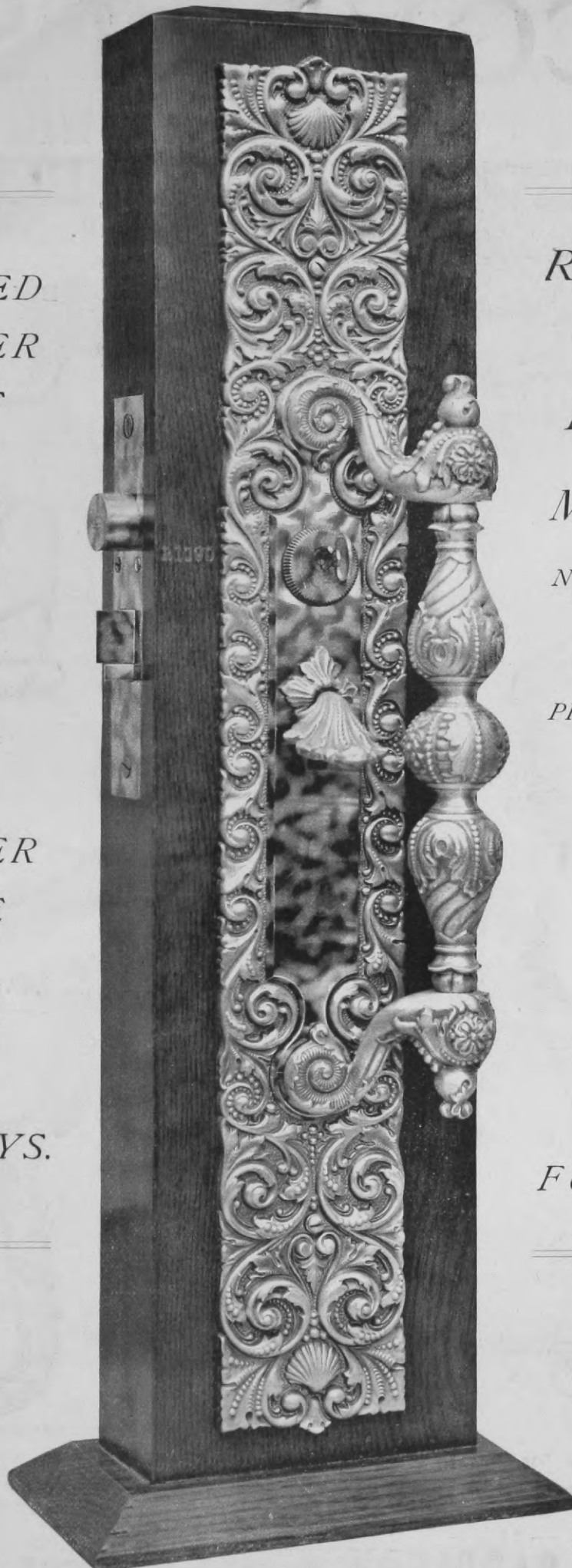


Embossed Bronze Metal
Knob No. 687 and
Escutcheon No. 649.

WROUGHT STEEL DOOR LOCKS.

*IMPROVED
CYLINDER
FRONT
AND
STORE
DOOR
LOCKS.*

*CYLINDER
OFFICE
DOOR
LOCKS
WITH
PASS KEYS.*



*RUSSELL
AND
ERWIN
MFG. CO.,*

*NEW BRITAIN,
CONN.*

NEW YORK.

PHILADELPHIA.

BALTIMORE.

LONDON.

*FINE
BRONZE
DOOR
FURNITURE.*

STORE-DOOR HANDLE and LOCK. No. R 109C.

SIZE OF PLATE, 23 x 3 $\frac{3}{8}$ inches.

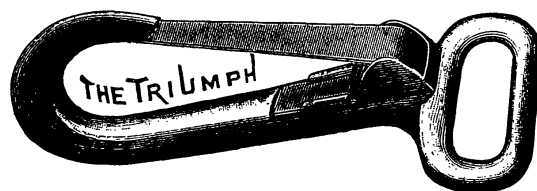
VICTOR.

COVERT'S

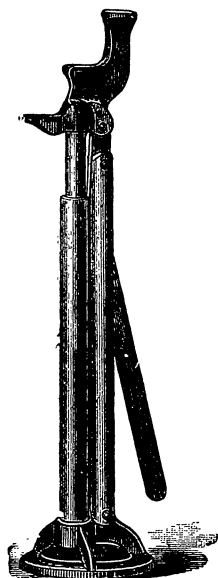
That Settles It Where to Buy.

ONLY ONE TRIUMPH SNAP
THAT IS COVERT'S

EVERY
FEATURE
A
TRIUMPH

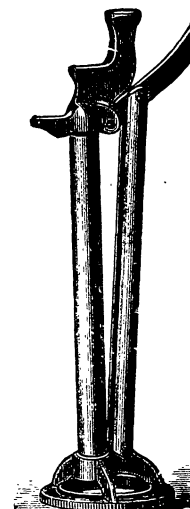


ACCEPT NO OTHER



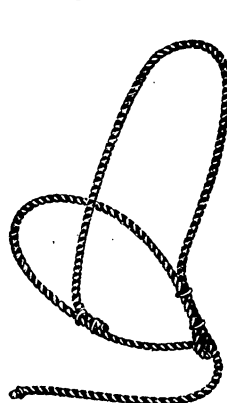
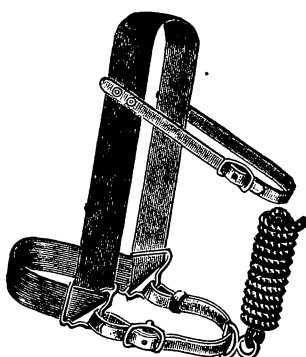
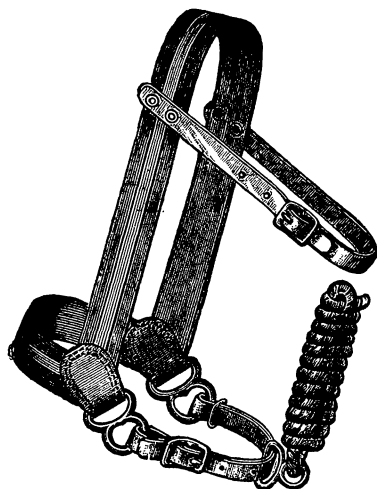
Up goes 1,600 lbs. with perfect ease.

Made in all sizes, both loop eye and round eye; also swivel eye and open eye, and double for bit snap. Roller eye for breast straps and baby sizes for satchels, etc.

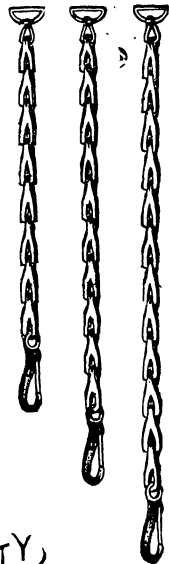


The "Victor" is the Best Selling Wagon Jack in the World. Fits any Carriage or Lumber Wagon.

Beware of Imitations.



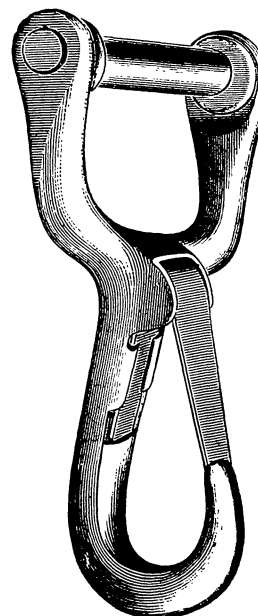
Solid Braided Black Hitching Cord.



Rein Chains



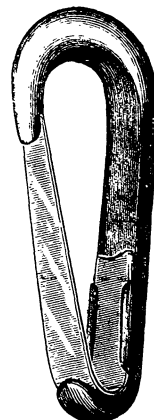
DANDY HAMES STRAP,
For Bottom of Hames,
IS PERFECTION.



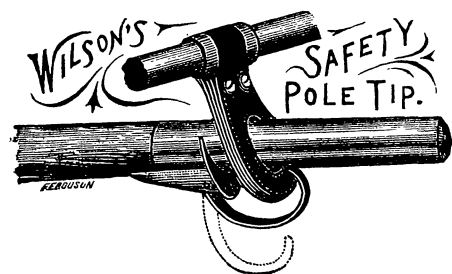
Roller Eye Breast Strap Snap.



Covert's "Success" Rope Clamp.



"Triumph" makes a Perfect Bit Snap.



Our Goods are for sale by all the leading Jobbers in the U. S., Canada and Europe at manufacturers' prices. Get our extensive Catalogue in Saddlery, Coach and General Hardware.

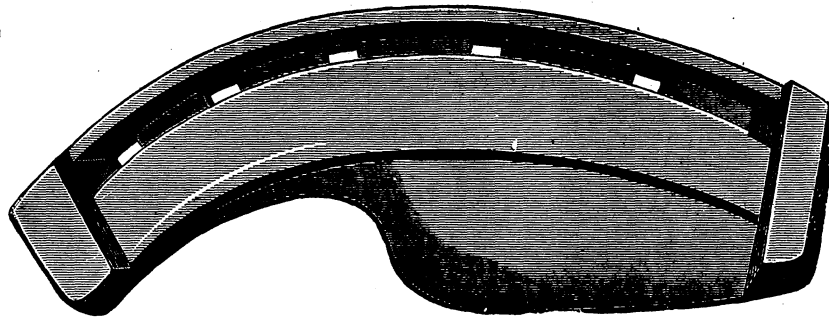
COVERT'S SADDLERY WORKS, Farmer, N. Y., U. S. A.

SCRANTON FORGING CO.,

SCRANTON, PA.

CARRIAGE HARDWARE AND SPECIAL DROP FORGINGS.

FORGED
OX
SHOES.



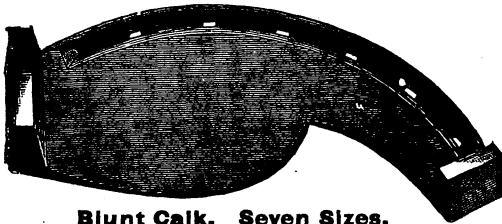
Made under Deebie's Patent, Aug. 9, 1887.

Our 1891 pattern is a modification of the style we have made for the past four years, giving additional strength to the web.

IT IS JUST RIGHT.

Mount Carmel Steel Toe Calk Ox Shoes.

The Best and Cheapest in the World.



Blunt Calk. Seven Sizes.

Warranted
to outwear
any shoe made.

WRITE FOR PRICES.



Sharp Calk. Six Sizes.

Walter W. Woodruff & Sons, Mount Carmel, Conn., U. S. A.

BURDEN'S HORSE SHOES.

"Burden Best"

Iron.

Boiler Rivets.

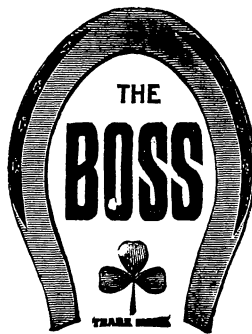
THE BURDEN IRON CO.

TROY, N. Y.

Standard Horse Shoe Co.,
Manufacturers of
HORSE AND MULE SHOES.

LEEDS, ROBINSON & CO., General Agents,

75 North Street, Boston, Mass.



HORSE AND MULE SHOES.

Superior Quality, Shape and Finish.

BRYDEN HORSE SHOE CO.,
CATASAUQUA, PA.

RHODE ISLAND PERKINS HORSE SHOE CO.,
MANUFACTURERS OF

Horse and Mule Shoes of the Perkins Pattern.

SPECIALTIES — X L Steel Shoes, Toe Weight Shoes and Goodenough Shoes.
Works at Valley Falls, R. I. Office, 31 Exchange Place, Providence, R. I.

F. W. CARPENTER, Pres., C. H. PERKINS, Gen. Manager, R. W. COMSTOCK, Sec'y,
CHARLES R. STARK, Treas.
J. C. McCARTY & CO., Agents - 97 Chambers Street, New York.

THE NEW DIAMOND STATE HORSE AND MULE SHOES.

JUST TRY THEM and YOU will say they excel all others.

MANUFACTURED BY

DIAMOND STATE IRON CO.
WILMINGTON, DELAWARE.

Other "high grade" specialties in Rivets, Spikes, Splice Bars, Track and Machine Bolts, Blanks, Nuts, Stay Bolt Iron, Horse Shoe Iron, Bar Iron, &c.

PHILADELPHIA OFFICE,
208 So. Fourth St.

{ Correspondence invited }

NEW YORK OFFICE
11 Pine St.

H. D. SMITH & CO.,

Plantsville, Conn.,

MANUFACTURERS OF THE BEST QUALITY

CARRIAGE MAKERS' HARDWARE,

MANUFACTURE THE LARGEST VARIETY OF

FORGED CARRIAGE IRONS

Of Best Material and Workmanship.

Send for Price and Illustrated List of

CHAMPLAIN

Manufactured by the NATIONAL HORSE NAIL CO.,
VERGENNES, VERMONT.

All Sizes. All Patterns. All Warranted. Sold Everywhere.

J. C. McCARTY & CO., Agents. New York.



Elegant Iron.

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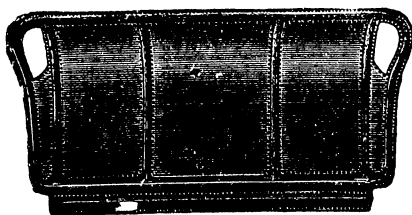
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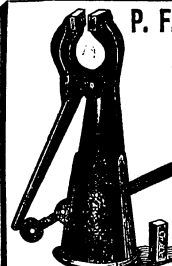
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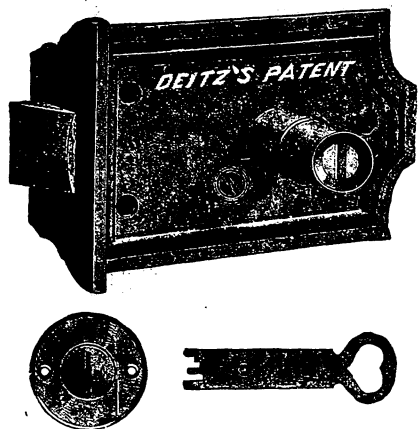
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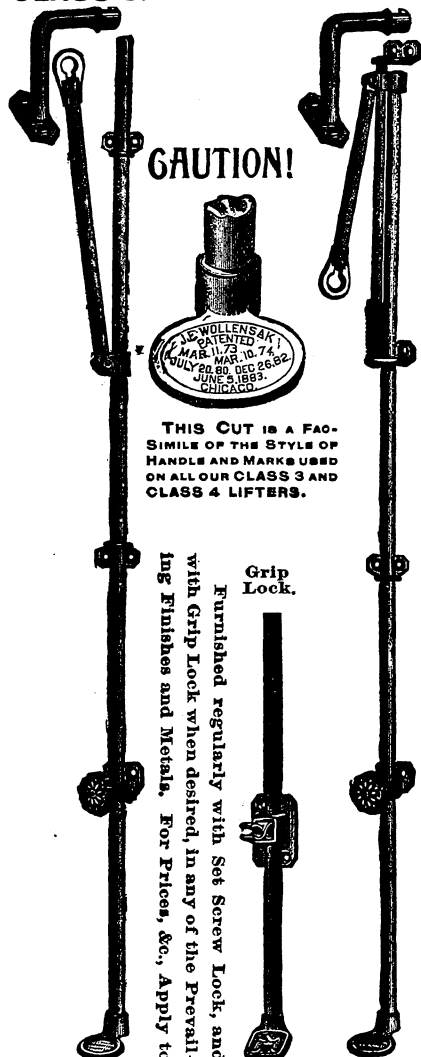
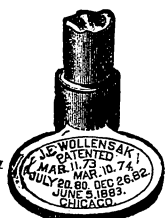
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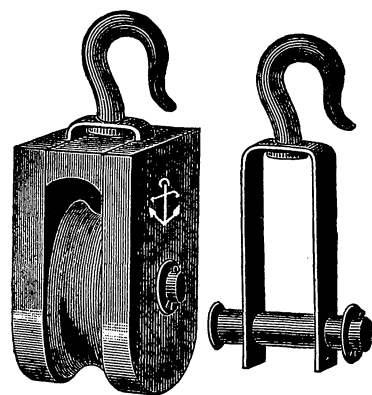
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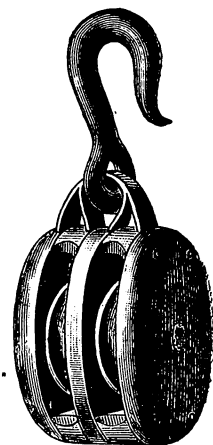


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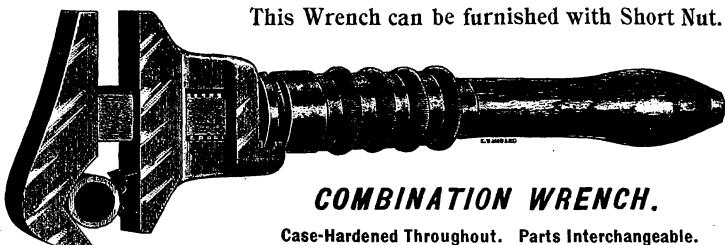
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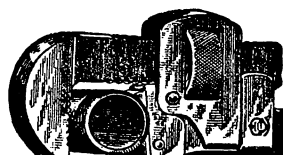
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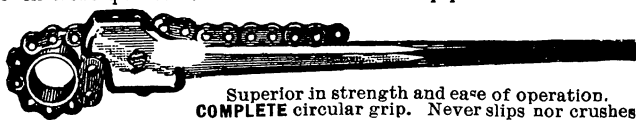
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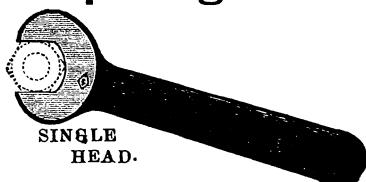
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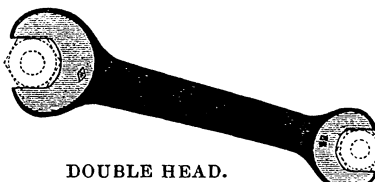
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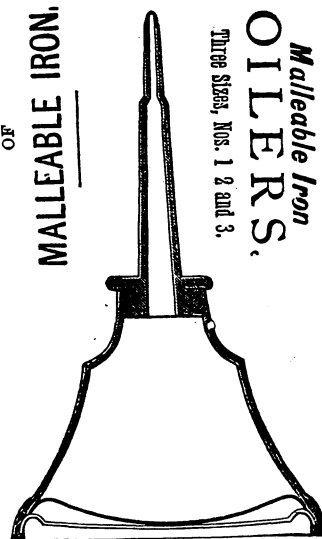
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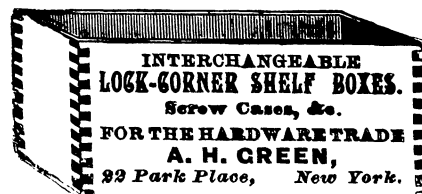
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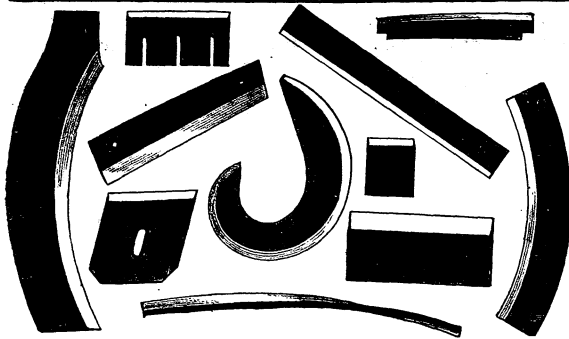
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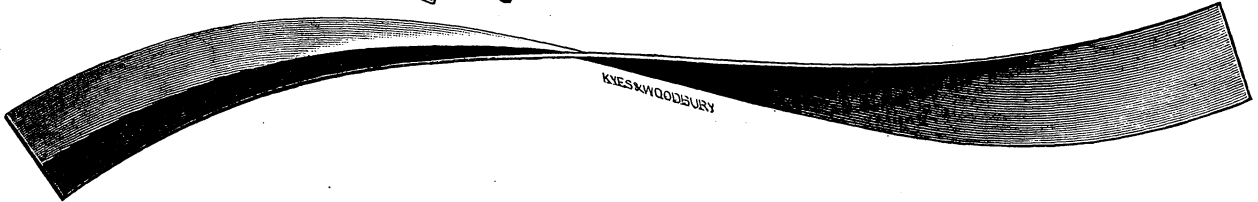
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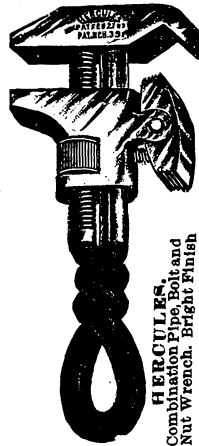
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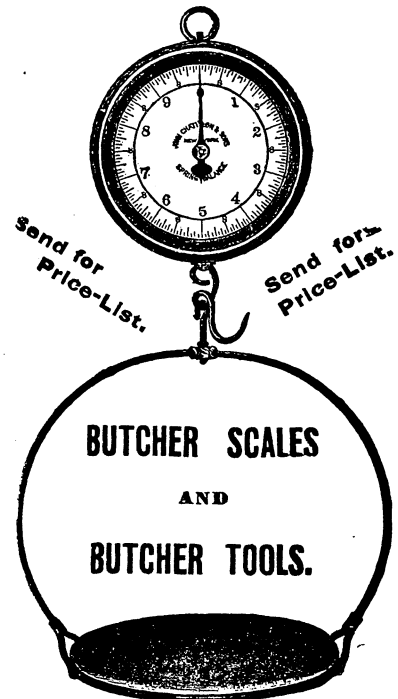
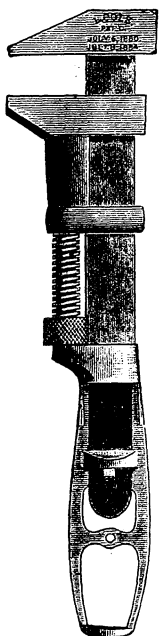
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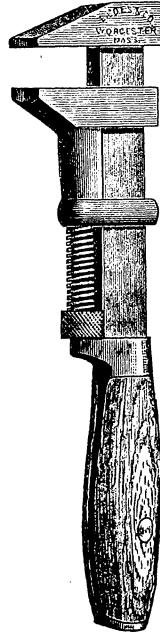
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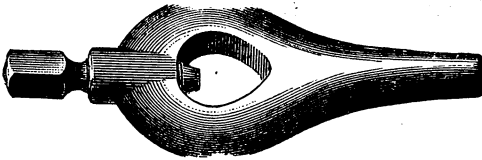
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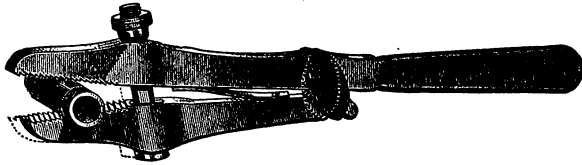
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5.....	1 3/4.....	80	15.....	4 1/2.....	2 75
6.....	1 3/4.....	95	16.....	5.....	3 25
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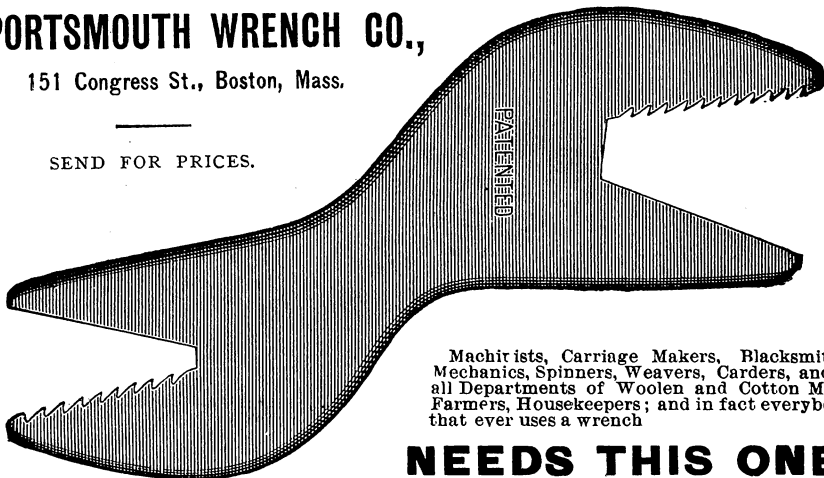
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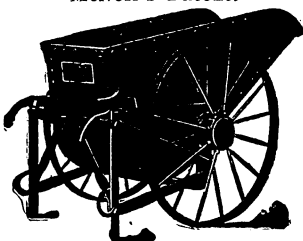
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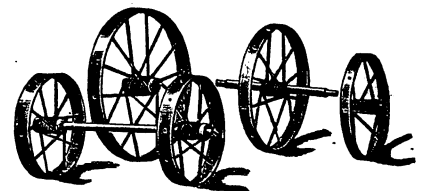
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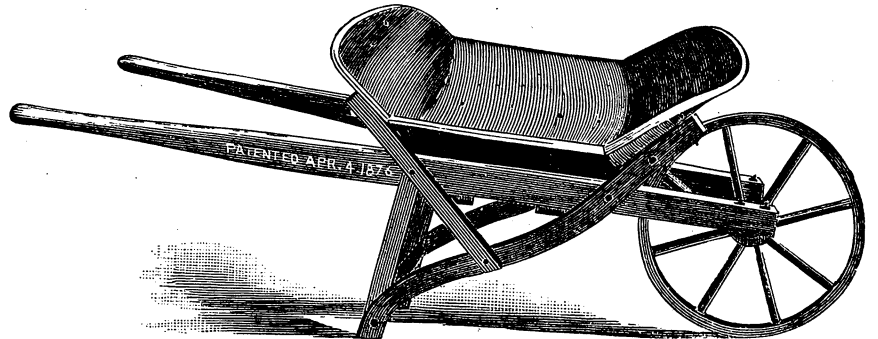
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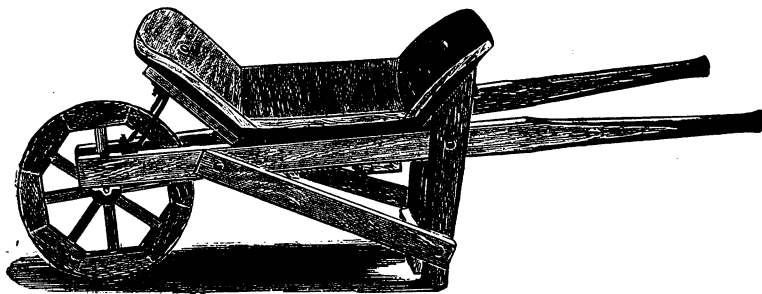
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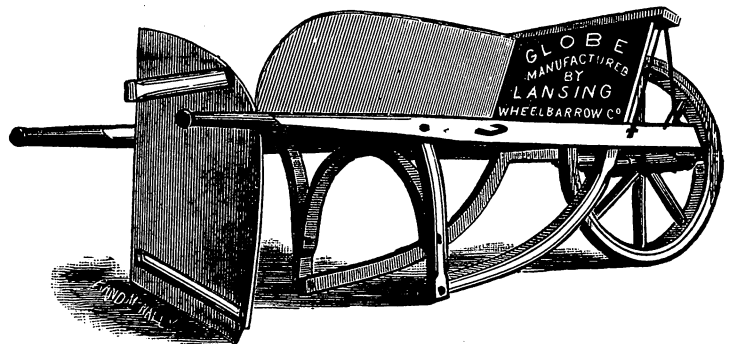
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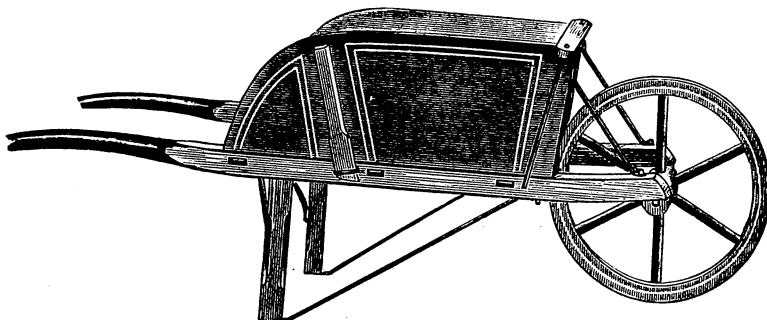
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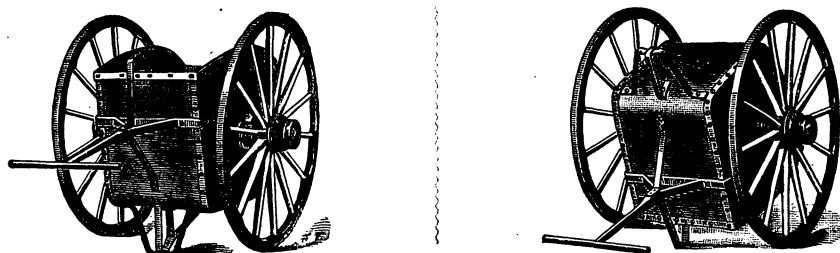
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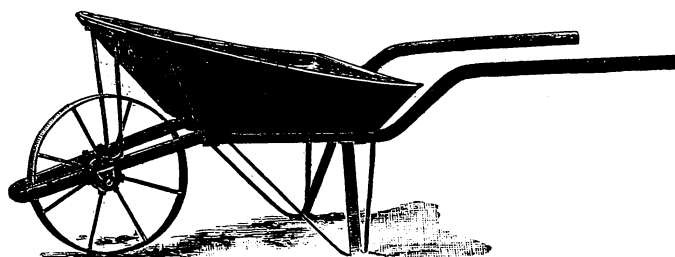


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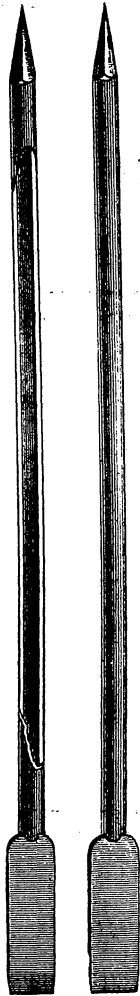
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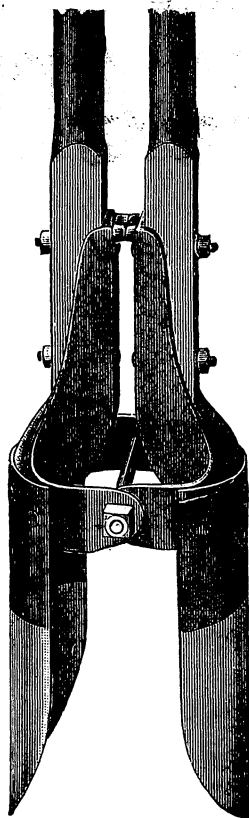
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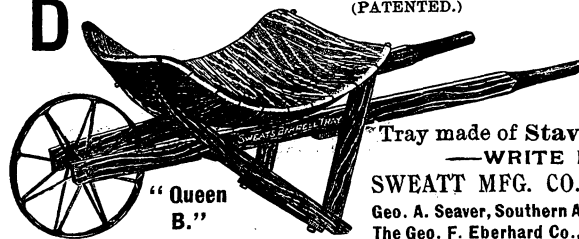
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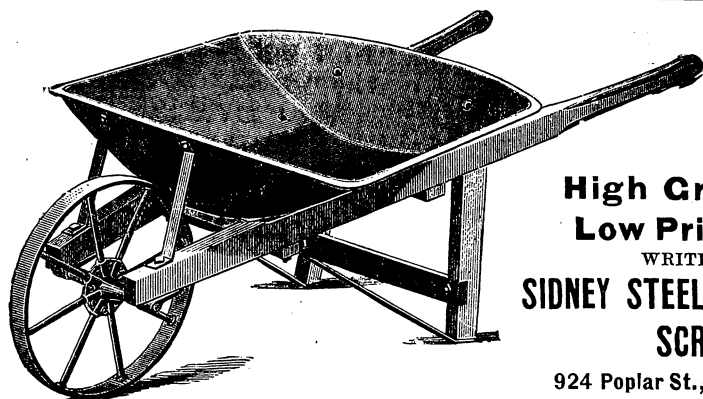
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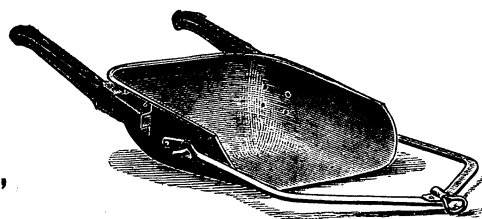
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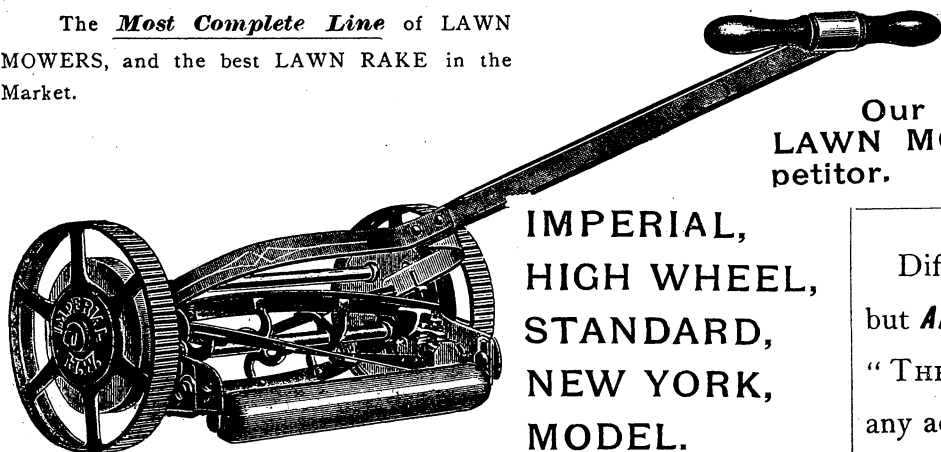


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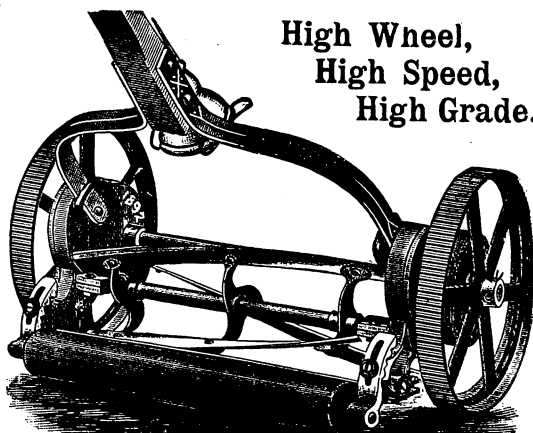
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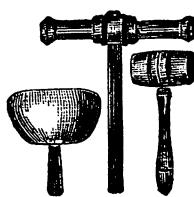
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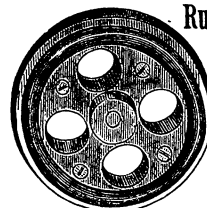
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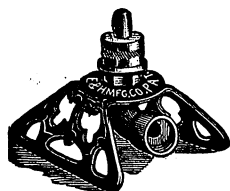


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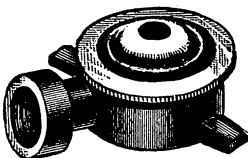


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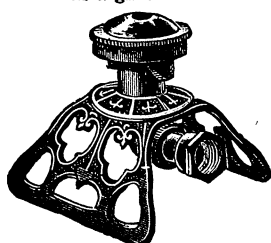
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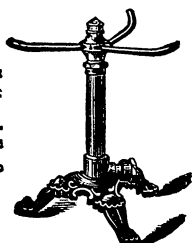


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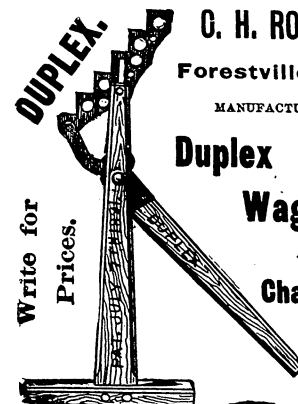
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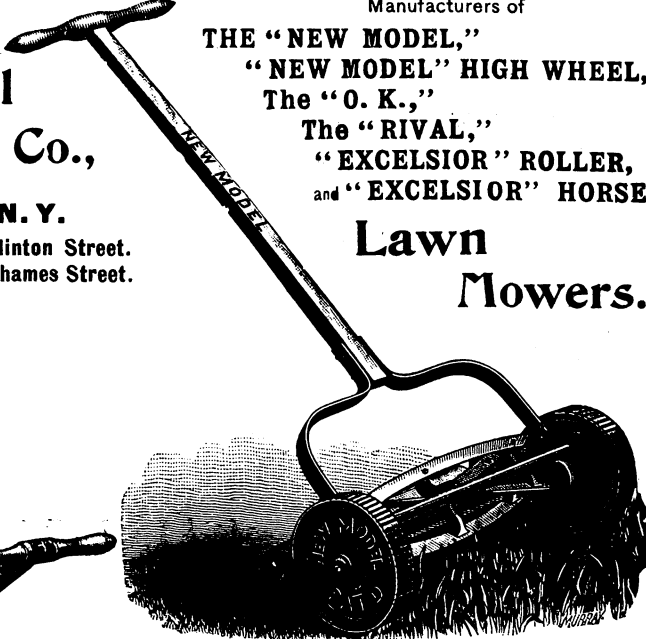
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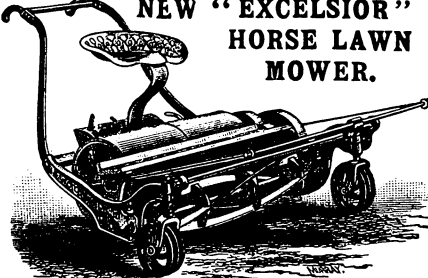
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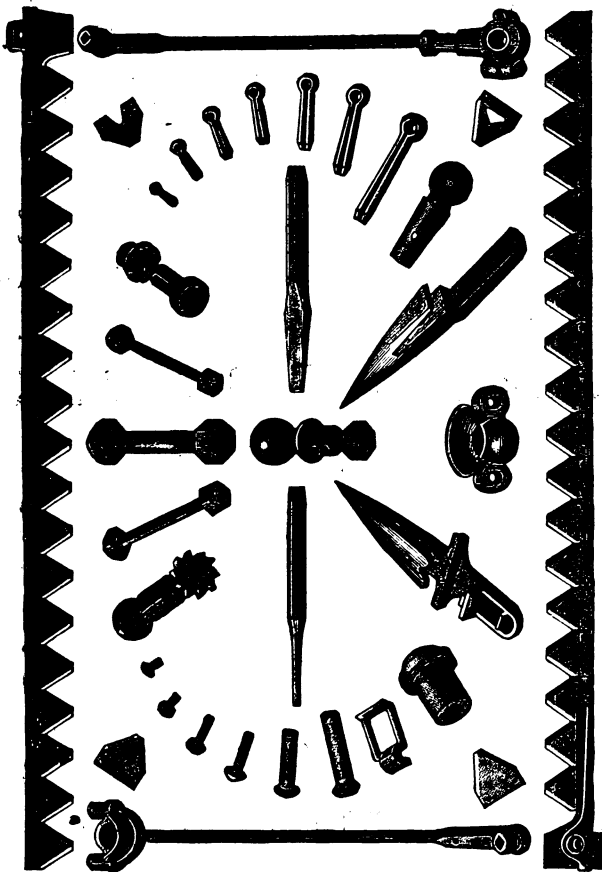
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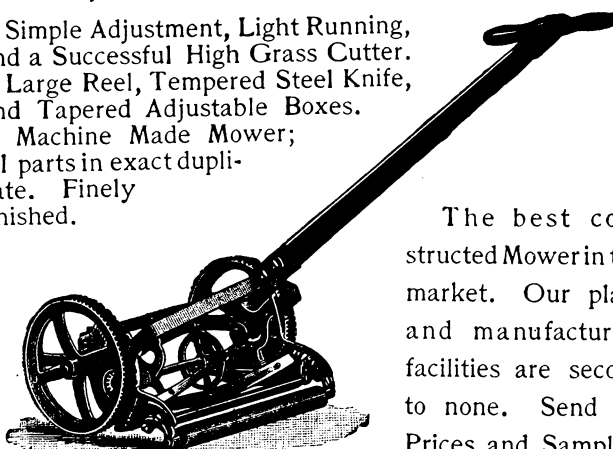
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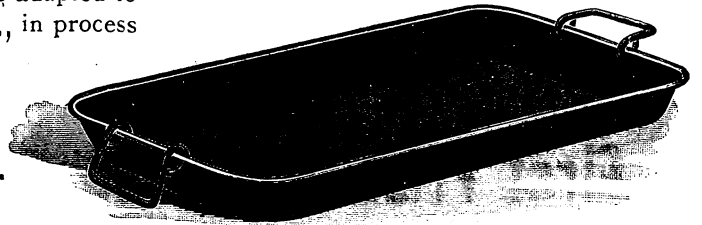


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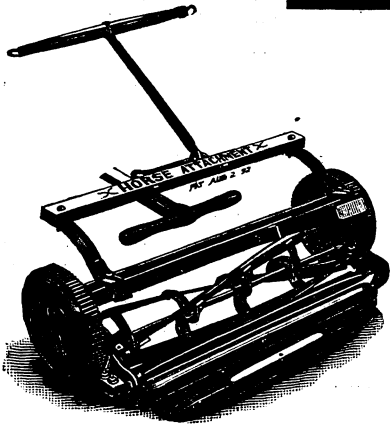
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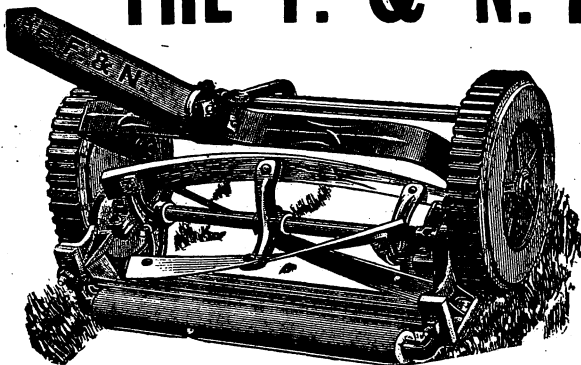
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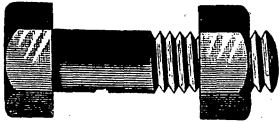
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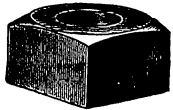


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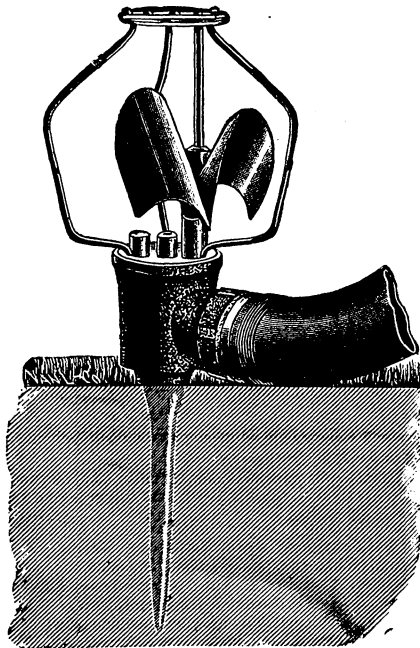
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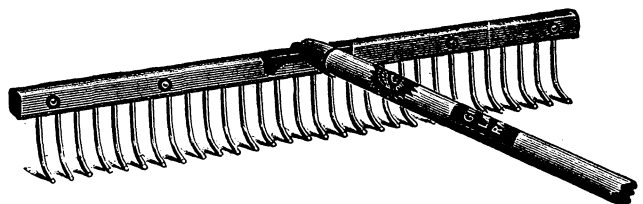
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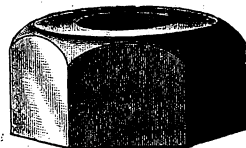
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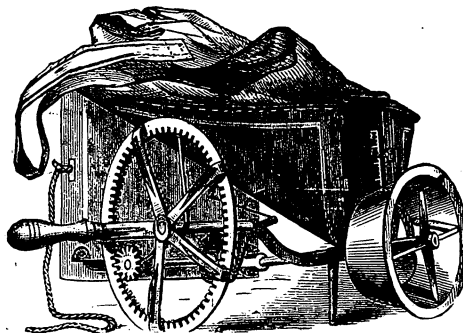
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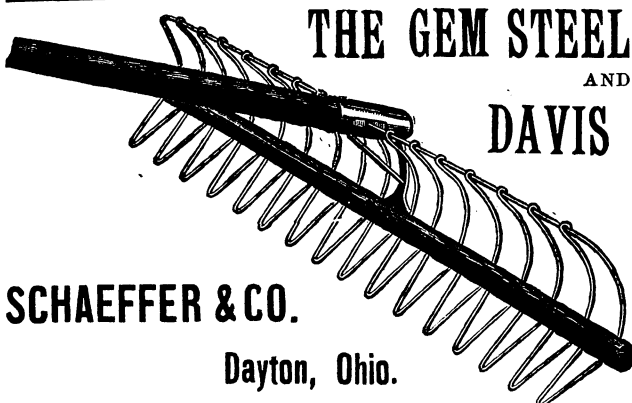
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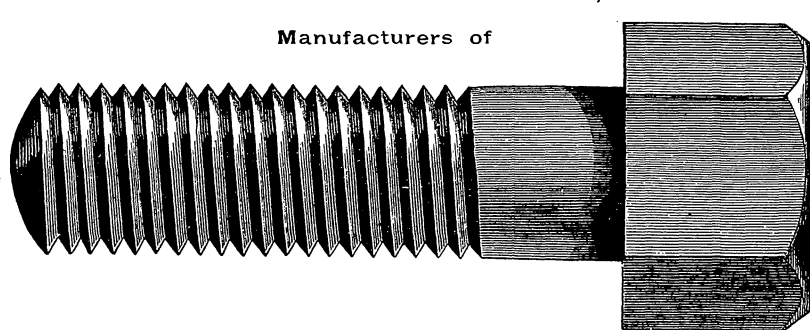


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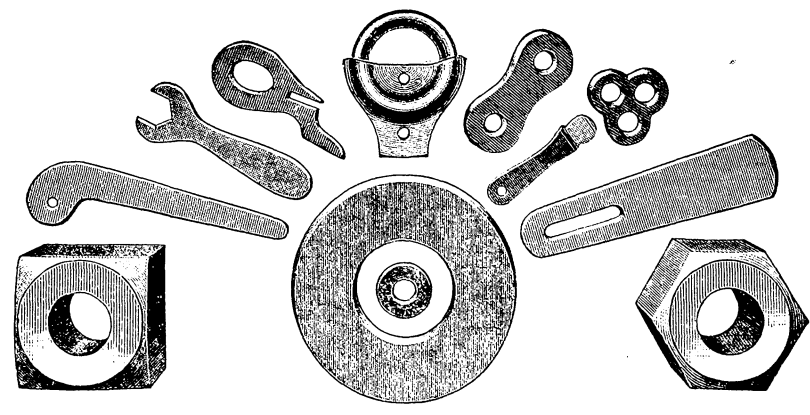
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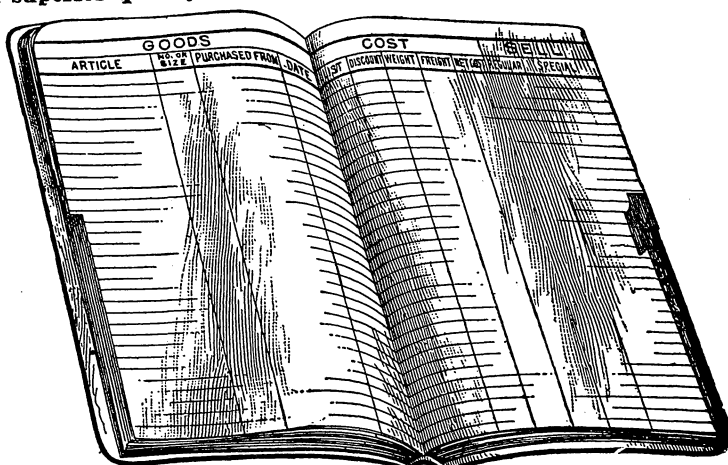
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Columns are provided for the name and number or size, for noting from whom purchased, date of quotation or purchase, list and discount, and for entering freight expenses as an element of cost. Under the heading of selling prices, the regular and any special price or remarks in regard to the goods are given place. This book goes into considerable detail in describing the goods and cost prices. It has been arranged in accordance with the views of many Hardwaremen whose methods are careful and exact.

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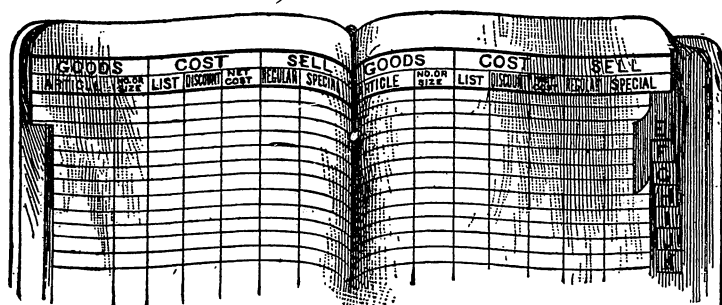
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In this book each page is complete, and the record of prices does not, as in Book A, run across two pages. Thus it accommodates a larger range of goods with much less detail in the record. It is adapted for office or store use, and by the use of familiar abbreviations, sufficiently large for the convenient and concise record of prices.

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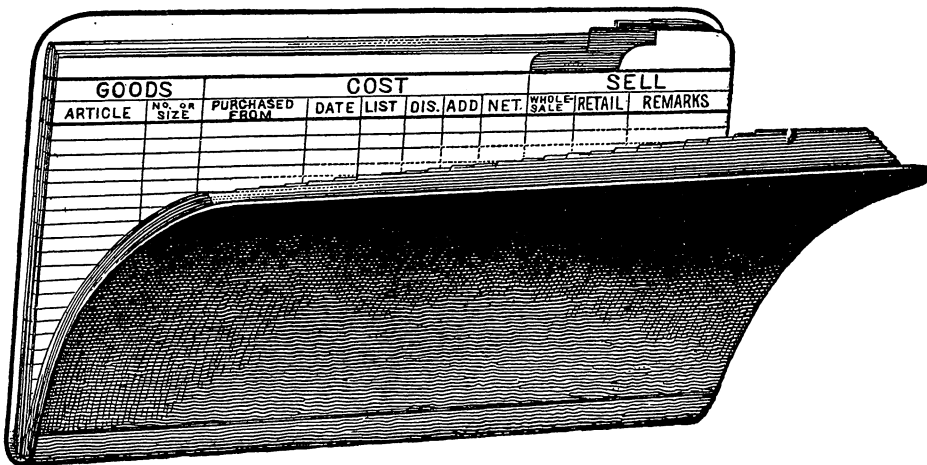
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The headings in Book C run across the top, in a line parallel with the hinge. In this way a very complete record can be kept on a single page. The details of weight and freight contained in Book A are omitted, and a single column headed "Add" given for the insertion of freight or other expenses which it is desirable to include in the cost. Under the selling prices space is left for the wholesale price, the retail price, and also for any remarks in regard to cost of the goods, desirability of pushing them, or other matters.

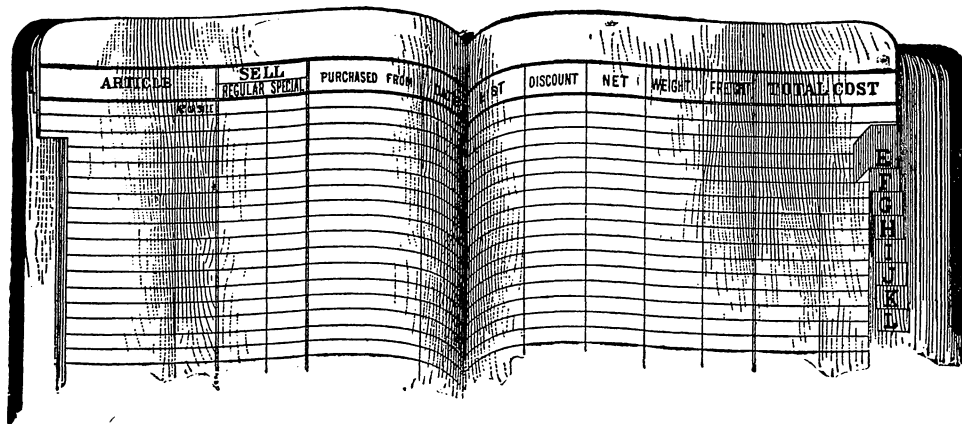
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Hardware Price Book C.



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arrangement is adapted to the requirements of the trade in this direction.

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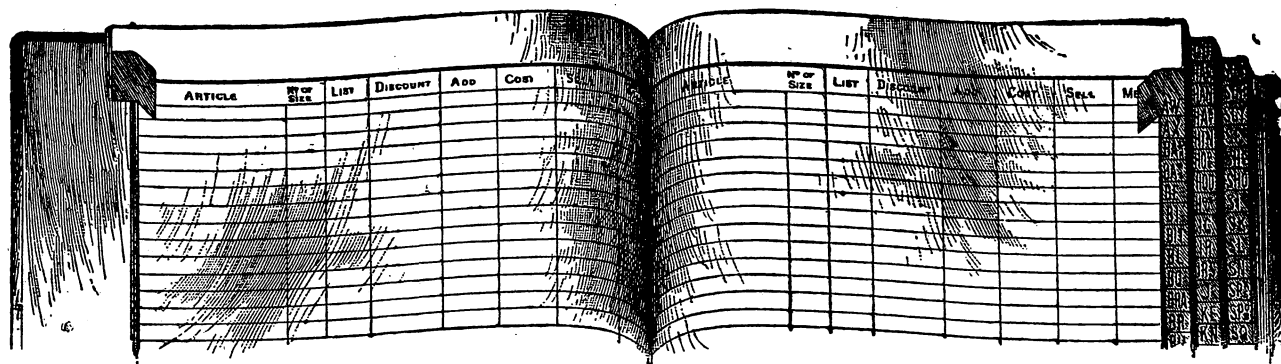
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Price Book D will recommend itself particularly for desk and store use, and for salesmen on the road.

The name of the article, its number or size and the selling price are the first to meet the eye on the left-hand page, as embodying information desired when the selling price is required. The other headings follow in convenient order, by which a detailed memorandum regarding the goods may be kept, the whole being seen at a glance. A number of pages at the back of the book are arranged for memoranda, which will be found a great convenience. This ar-

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" Saws, " SAW	" Cartridges, " CAR	" Shovels, " SHO
" Pumps, " PUM	" Rules, " RU	" Grindstones, " GRI
" Bits, " BIT	" Locks, " LO	" Stones, " STO

Special care has been taken to make the classification as indicated in the index correct and comprehensive, making provision for all Hardware articles and giving sufficient space for the keeping and recording of prices. It is thought that every strictly Hardware article has its first two or three letters given, thus permitting immediate reference to it by a single motion.

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Sigourney Tool Co., Hartford, Conn.
Silver Mfg. Co., Salem, O.
Smith Friction Drill & Tool Co., Boston, Mass.
Woodward & Rogers, Hartford, Conn.
- Drop Forgings.**
Belden Mach. Co., New Haven, Conn.
Billings & Spencer Co., Hartford, Conn.
Boone, W. C. Mfg. Co., Boonton, N. J.
Eccles, Richard, Auburn, N. Y.
Herbrand Co., Framont, O.
Merrill Bros., 26 First, Brooklyn, E. D.
Miner & Peck Mfg. Co., New Haven, Ct.
Phila. Drop Forge Co., Philadelphia, Pa.
Scranton Forging Co., Scranton, Pa.
Spies, J. C. & Co., Worcester, Mass.
Williams, J. H. & Co., Brooklyn, N. Y.
Willmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Drop Frames.**
Wyman & Gordon, Worcester, Mass.
- Drop Frames.**
Bliss, E. W. & Co., Brooklyn, N. Y.
Crosby, G. A. & Co., Chicago, Ill.
Eaton, Geo. H. & Co., Boston, Mass.
Ferracute Mch. Co., Bridgeton, N. J.
Miner & Peck Mfg. Co., New Haven, Conn.
Stiles & Parker Press Co., Brooklyn, N. Y.
Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.
- Dumb Waiters.**
Storm Mfg. Co., Newark, N. J.
- Dynamite.**
New York Powder Co., 62 Liberty St., N. Y.
- Dynamos.**
Lovell Mfg. Co., Ltd., Erie, Pa.
Zucker & Levett Chemical Co., 10 to 14 Grand St., N. Y.
- Edge Tools, Makers of.**
Amer. Axe & Tool Co., 280 B'way, N. Y.
Buck Bros., Millbury, Mass.
Butcher, W. & S., 136 Duane St., N. Y.
Buffalo Edge Tool Wks., Buffalo, N. Y.
Mann Edge Tool Co., Lewiston, Pa.
Plumo, Fayette R., Philadelphia.
Standard Axe & Tool Co., Ridgway, Pa.
White, L. & I. J., Buffalo, N. Y.
- Egg Beaters.**
North Bros. Mfg. Co., Philadelphia.
- Electric Bells and Supplies.**
Ostrander, W. R. & Co., New York.
Wollensak, J. F., Chicago, Ill.
- Electric Dynamo Machines.**
Eddy Electric Mfg. Co., Windsor, Conn.
Hanson & Van Winkle Co., Newark, N. J.
- Electric Elevators.**
Smith Hill Co., Quincy, Ill.
- Electric Welding.**
Thomson Electric Welding Co., Boston, Mass.
- Electro-Platers.**
Boardman, L. & Son, East Haddam, Ct.
Elevator Buckets.
W. J. Clark & Co., Salem, Ohio.
- Elevator Gates.**
Richmond Safety Gate Co., Richmond, Ind.

See Alphabetical Index, Page 152.

- Elevators. *Makers of.***
Link-Belt Engineering Co., Phila., Pa.
Moline Elevator Co., Moline, Ill.
Morse, Williams & Co., Phila., Pa.
Salem Fdry & Mch Co., Salem, Mass.
Variety Mch. Co., Warsaw, N. Y.
- Emery Wheels.**
Bell, Geo. E., 36 John St., N. Y.
Excelsior Emery Wheel Co., Springfield, Mass.
Grant Corundum Wheel Mfg. Co., Chester, Mass.
Michigan Emery Wheel Co., Detroit, Mich.
N. Y. Belting & Packing Co., Ltd., N. Y.
Northampton Emery Wheel Co., Leeds, Mass.
Norton Emery Wheel Co., Worcester, Mass.
Springfield Emery Wheel Mfg. Co., Bridgeport, Conn.
Waltham Emery Wheel Co., Waltham, Mass.
- Enamels.**
Nubian Iron Enamel Co., Cragin Ill
- Engineers and Contractors.**
Aiken Henry & Sons, Pittsburgh, Pa.
Artificial Gas Engineering Co., Pittsburgh, Pa.
Brady Mfg. Co., Brooklyn, N. Y.
Carten, Henry J., Pittsburgh, Pa.
Christie, W. Wallace, Paterson, N. Y.
Curtis, Gram, Pittsburgh, Pa.
Herrick, J. A., 264 Pearl St., N. Y.
Kennedy, Julian, Pittsburgh, Pa.
Laughlin, Alex. & Co., Pittsburgh, Pa.
Lean, D. R., Co., Pittsburgh, Pa.
McClure, Amsler & Co., Pittsburgh, Pa.
Pittsburgh Iron & Steel Engineering Co., Pittsburgh, Pa.
Roberts, Frank C., Philadelphia, Pa.
Smythe, S. R. Co., Incorporated Pittsburgh, Pa.
Swindell, W. & Bros., Pittsburgh, Pa.
Wilkie, Bothwell & Co., Ltd., Pittsburgh, Pa.
- Engines, *Makers of.***
Otto Gas Engine Works, Phila., Pa.
- Engines, *Steam. Makers of.***
Buckeye Engine Co., Salem, Ohio.
Cleveland & Harwick, Erie, Pa.
Harrisburg Fdy. & Machine Works, Harrisburg, Pa.
Lane & Bowley Co., Cincinnati, O.
Norwalk Iron Works Co., So. Norwalk, Conn.
Shipman Engine Co., Boston, Mass.
Southwark Foundry and Machine Co., Phila., Pa.
Tod, William & Co., Youngstown, O.
Wetherill, Robt. & Co., Chester, Pa.
- Exhaust Tumblers.**
Sweester, W. A., Brockton, Mass.
- Expansion Bolts.**
Boone, W. C. & Son, Brooklyn, N. Y.
Church, Isaac, Toledo, O.
- Faucets, *Self-measuring.***
Lane Bros., Poughkeepsie, N. Y.
- Faucets, *Wooden. Makers of.***
Bacon & Lockport Block Co., Boston, Mass., and Lockport, N. Y.
John Sommer's Son, Newark, N. J.
- Feed-Water Heaters.**
Berrymann, Jas., Philadelphia, Pa.
Davis, I. H. & Son, Hartford, Conn.
Goubert Mfg. Co., 32 Cortlandt St., N. Y.
Harron Safety Boiler Wks., Phila., Pa.
National Pipe Bending Co., New Haven, Conn.
Webster, Warren & Co., Phila., Pa.
Whitlock Coil Pipe Co., Elmwood, Conn.
- Fencing, *Iron and Wire.***
Barnum, E. T., Detroit, Mich.
B. B. Wire Co., Indianapolis, Ind.
Champion Iron Co., Kenton, O.
Clinton Wire Cloth Co., Clinton, Mass.
DeKalb Fence Co., Del. City, Ill.
Gilbert & Bennett Mfg. Co., 42 Cliff St., Hartman Mfg. Co., Beaver Falls, Pa.
Kilmer Mfg. Co., Newburgh, N. Y.
Mast, Foot & Co., Springfield, O.
The Van Dorn Iron Works Co., Cleveland, O.
- Reliance Wire Works Co., Milwaukee, Wis.**
- Files, *Importers of.***
Moss, F. W., 80 John, N. Y.
- Files and Raps, *Manufacturers of.***
Barnett, G. & H., 41 & 43 Richmond Phila.
Butcher, W. & S., 135 Duane St., N. Y.
McCarthy File Co., Philadelphia.
Nicholson File Co., Providence R. I.
- Fire Brick, *Makers of.***
Borgner, Cyrus, Philadelphia, Pa.
Gardner, Jas. & Son, Cumberland, Md.
Kreischer B. & Sons, Foot E. Houston, St. Maurer, H. & Son, 420 E. 23d, N. Y.
Renovo Fire Brick and Clay Co., Phila.
Ostrander Fire Brick Co., Troy, N. Y.
Presbury Stove Lining Co., Taunton, Mass.
Valentine, M. D. & Bro., Woodbridge, N. Y.
- Fire Sets.**
Troy Nickel Works, Troy, N. Y.
- Fishing Tackle.**
Dodge, Stoddard & Kendall Boston, Mass.
Enterprise Mfg. Co., Akron, O.
- Flint and Emery Paper.**
Baeder, Adamson & Co., Phila., Pa.
- Flour Sifters.**
Meyers, F. J. Mfg. Co., Covington, Ky.
- Flower Stands.**
Covington, S. E., Bellefontaine, O.
- Fly Fans.**
Matthal, Ingram & Co., Baltimore, Md.
- Fodder Cutters.**
Silver Mfg. Co., Salem, O.
- Forges, *Portable, &c.***
Bradley & Co., Syracuse, N. Y.
Bullock Bellows Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Empire Portable Forge Co., Lansingburg, N. Y.
Foss Mfg. Co., Springfield, Ohio.
Sturtevant, B. & Co., Boston, Mass.
- Forgings, *Iron and Steel.***
Bethlehem Iron Co., S. Bethlehem, Pa.
Cambria Steel-Cambria Iron Co., Johnstown, Pa.
Scranton Forging Co., Scranton, Pa.
- Foundry Facings.**
Chicago Fdy. Supply Co., Chicago, Ill.
MacKellar Foundry Facing & Supply Co., Quincy, Ill.
- Paxson, J. W. & Co., Phila.**
S. Obermayer Co., Cincinnati, O.
Smith, J. D. Fdy. Supply Co., Cin., O.
Whitehead Bros. Co., 517 W. 15th St.,
- Foundry Riddles.**
Estey, W. S. 65 Fulton, N. Y.
- Foundry Supplies.**
Chicago Fdy. Supply Co., Chicago, Ill.
Collins, Victor, Detroit, Mich.
MacKellar Fdy. Facing & Supply Co., Quincy, Ill.
S. Obermayer Co., Cincinnati, O.
Paxson, J. W. & Co., Philadelphia.
Smith, J. D. Fdy. Supply Co., Cin., O.
Whitehead Bros. Co., 517 W. 15th St.,
- Clutchers.**
Moore & White Co., Philadelphia, Pa.
- Fruit Presses.**
Enterprise Mfg. Co., Philadelphia, Pa.
- Fuel Burners.**
Collins, W. S., 45 Drexel Bldg., N. Y.
- Furnaces, *Foundry.***
Byram & Co., Detroit, Mich.
Furnaces, Gasoline, Pa.
Burgess Soldering Furnace Co., Columbus, Ohio.
- Garden Tools.**
Dunlap, C. W., Box 2703, New York.
Noyes, B. B. & Co., Greenfield, Mass.
- Gas Producers.**
Wood, R. D. & Co., Philadelphia, Pa.
- Gas & Steam Fitters' Supplies.**
Pancost & Maule, Phila., Pa.
- Gear Cutters.**
T. E. Whiton Mach. Co., New London, Conn.
Boston Gear Works, Boston, Mass.
New Process Raw Hide Co., Syracuse, N. Y.
Poole, Robt. & Son Co., Baltimore, Md.
Union Fdy. & Mch. Co., Pittsburgh, Pa.
- Glass Bureaus.**
Canton Saw Co., Canton, O.
- Glass Tubes.**
Ashcroft Mfg. Co., 111 Liberty St., N. Y.
- Glass Cutters.**
Monroe, S. G., Bristol, Conn.
- Gears.**
Baeder, Adamson & Co., Phila., Pa.
Improved Process Gius Co., Gloucester, Mass.
- Grinding Mills.**
Kusiss Cement Co., Gloucester, Mass.
- Grinding and Polishing Machines.**
Diamond Mch. Co., Providence, R. I.
Herrick & Cowell, New Haven, Conn.
Norton Emery Wheel Co., Worcester, Mass.
- Washburn Shops, Worcester, Mass.**
- Grindstone Dressing Machinery.**
Blake & Johnson, Waterbury, Conn.
- Grindstones.**
Cleveland Stone Co., Cleveland, O.
Huron Grindstone Co., Port Austin, Mich.
- Gun Implements.**
Union Hdw. Co., Torrington, Conn.
- Gunpowder, *Makers of.***
Lafin & Rand Powder Co., N. Y.
- Hand Carts.**
Lansing Wheelbarrow Co., Lansing, Mich.
- Hand Screws.**
Grand Rapids Hand Screw Co., Grand Rapids, Mich.
- Handles.**
Estes, E. B. & Sons, 254 Pearl St., N. Y.
Harwell, E. B., Gallipolis, Ohio.
New Process Raw Hide Co., Syracuse, N. Y.
New York Mallet and Handle Wks., 450 E. Houston St., N. Y.
- Hangers, *Door.***
Chicago Spring Butt Co., Chicago, Ill.
Cronk Hanger Co., Elmira, N. Y.
Lane Bros., Poughkeepsie, N. Y.
Victor Mfg. Co., Newburyport, Mass.
- Hardware Common Merchants.**
Doser, Martin, 88 Chambers, N. Y.
Jacobus, W. H., 90 Chambers, N. Y.
- Hardware Manufacturers.**
Dunlap, C. W., Box 2703, New York.
Hickman, E. & Bridgeport, Conn.
Stearns, E. C. & Co., Syracuse, N. Y.
Union Mfg. Co., 103 Chambers, N. Y.
Yale & Towne Mfg. Co., Stamford, Conn.
- Hardware Mfrs. Agents.**
Bingham, W. Co., Cleveland, O.
Johnson, John & Co., 113 Chambers, McCoy, Jos. F. Co., 25 Warren St., N. Y.
Sickles, Sweet & Lyon, 35 Barclay, N. Y.
Surplus, Dunn & Alder, 97 Chambers St., New York.
Underhill, Clinch & Co., 94 Chambers St., N. Y.
- Hardware Specialties.**
Acme Shear Co., Bridgeport, Conn.
Bailey, F. E. & Co., Chicago, Ill.
Beiden Machine Co., New Haven, Conn.
Clark Mfg. Co., Buffalo, N. Y.
Cleveland Fdy. Co., Cleveland, O.
Copeland Hdw. Mfg. Co., Worcester, Mass.
Empire Portable Forge Co., Lansingburg, N. Y.
Enterprise Mfg. Co., Philadelphia, Pa.
Ette & Henger Mfg. Co., St. Louis, Mo.
Gwinmer Mfg. Co., Hamilton, O.
Hart, H. C. Mfg. Co., Detroit, Mich.
Henn, A. S. & Co., New Haven, Conn.
Home Novelty Mfg. Co., St. Louis.
North Bros. Mfg. Co., Philadelphia, Pa.
Welland, Chas., 113 Chambers St., N. Y.
Wire Goods Co., Worcester, Mass.
Underhill, Clinch & Co., 94 Chambers Street, N. Y.
- Hardware, *Yacht and Ship.***
Ferdinand, L. W. & Co., Boston, Mass.
- Harrows, *Shaps.***
Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Wks., Farmer, N. Y.
Fitch, W. & E. T., New Haven, Conn.
- Hay Knives.**
Holt, Hiram Co., E. Wilton, Me.
- Holisting Machines.**
Ferdinand, L. W. & Co., 318 Green, Phila.
J. W. Holisting & Conveying Mch. Co., Cleveland, Ohio.
Fulton Iron & Engine Wks., Detroit, Mich.
Harrington, E. Son & Co., Phila.
Lane Bros., Poughkeepsie, N. Y.
Lidgerwood Mfg. Co., 98 Liberty, N. Y.
Mills & Beekley, Philadelphia.
Moore Mfg. & Fdy. Co., Milwaukee, Wis.
- Hollow-Ware.**
Bronson Supply Co., Cleveland, Ohio.
Morse, Williams & Co., Phila.
Sellers, Wm. & Co., Phila. and N. Y.
Speldel, J. G., Reading, Pa.
Yale & Towne Mfg. Co., Stamford, Ct.
- Cleveland Stamping & Tool Co., Cleveland, O.**
Stuart & Peterson Co., Phila., Pa.
- Holloware, *Aluminum.***
Illinois Pure Aluminum Co., Lemont, Ill
- Horse and Barbers' Clippers.**
Hotchkiss, E. S., Bridgeport, Conn.
- Horse Nails, *Makers of.***
Ausable Horse Nail Co., 4 Warren, N. Y.
National Horse Nail Co., Vergennes, Vt.
- Horse Shoes, *Makers of.***
Bacon Horse Shoe Co., Catsaqua, Pa.
Burden Iron Co., Troy, N. Y.
Diamond State Iron Co., Wilmington, Del.
Old Dominion Iron & Nail Works Co., Richmond, Va.
Phoenix Horse Shoe Co., Poughkeepsie, N. Y.
Rhode Island Perkins Horse Shoe Co., Providence.
Standard Horse Shoe Co., Boston, Mass.
The Burden Iron Co., Troy, N. Y.
- Hose.**
N. Y. Belting & Packing Co., Ltd., 15 Park Row, N. Y.
- Hydrants, &c.**
McLean, John, 296 & 298 Monroe, N. Y.
- Hydraulic Jacks.**
Dugdon, Richard, 24 Columbia, N. Y.
Watson & Stillman, 204 E. 43d, N. Y.
- Ice-Cream Freezers.**
North Bros. Mfg. Co., Phila., Pa.
Packer, C. W., Philadelphia, Pa.
Pearless Freezer Co., Cincinnati, Ohio.
Shepard Hdw. Co., Buffalo, N. Y.
White Mountain Freezer Co., Nashua, N. H.
- Ice Picks.**
Copeland Hdw. Mfg. Co., Worcester, Mass.
- Ice Shavers.**
Enterprise Mfg. Co., Philadelphia, Pa.
- Injectors.**
Jenkins Bros., New York.
Sherwood Mfg. Co., Buffalo, N. Y.
- Insurance, *Boiler.***
Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.
- Iron and Steel, *Sweatens.***
Lundberg, Gustaf, Boston, Mass.
Milne, A. & Co., 1 Broadway, N. Y.
Page, Newell & Co., Boston, Mass.
- Iron Commission Brokers.**
Corning, Edw. & Co., 39 B'way, N. Y.
Cotton, Bradley & Co., Philadelphia.
Fleming, Edw. J., Philadelphia.
Hogan, John & Co., Philadelphia, Pa.
Hoffman, J. W. & Co., Philadelphia.
Levis, Henry & Co., Philadelphia.
Keeley, Jerome & Co., Philadelphia.
Lee, J. Tatnall & Co., Philadelphia.
Mohr, J. J., 430 Walnut, Philadelphia.
Harr, E. R. & Co., Philadelphia.
Pilling & Grape, Philadelphia, Pa.
Sibell, Geo. H. & Co., Chicago, Ill.
Wilhelm & Co., Harrisburg, Pa.
Wister, L. & R. & Co., Phila., Pa.
- Iron Ore.**
Naylor & Co., 45 Wall, N. Y.
Richardson, Brown & Co., Chicago, Ill.
Pullman, J. Wesley, Phila., Pa.
Samuel, Frank, Philadelphia, Pa.
- Iron, *Manufacturers of.***
Barnes, C. K. & Co., Philadelphia, Pa.
Borden & Lovell, 70 West, N. Y.
Bessieus & Cumille, Philadelphia.
Corning Edw. & Co., 29 B'way, N. Y.
Cox, Justice, Jr., Philadelphia.
Cotton, Bradley & Co., Philadelphia.
Hoffman, J. W. & Co., Philadelphia.
Judson, B. F., 457 Water, St., N. Y.
Leonard, J., 440 West St., N. Y.
Lundberg, Gustaf, Boston, Mass.
Nicolls, Wheeler & Co., Philadelphia.
Ogden & Wallace, 85 Elm St., N. Y.
Page, Newell & Co., Boston, Mass.
Pickards, Brown & Co., Chicago, Ill.
Pierston & Co., 24-27 West, N. Y.
Richards, D. V. & Co., 88 Mangin St., N. Y.
Walton, Wm. H. & Co., Albany.
Washington Streets, N. Y.
Whitney, A. R. & Co., 17 E'way, N. Y.
Wilson, S. H. & Co., Philadelphia.
- Iron, *Importers.***
Abbott, Jere & Co., N. Y. and Boston.
Judson, B. F., 457 Water St., N. Y.
Lundberg, Gustaf, Boston, Mass.
- Iron, *Sheet, Manufacturers of.***
Atina Iron & Steel Co., Bridgeport, O.
Cambridge Iron & Steel Co., Cambridge, Ohio.
Wheeling Steel & Iron Co., Wheeling, W. Va.
W. D. Voss Wood Co., Ltd., McKeesport, Pa.
- Ironwork, *Ornamental.***
Barnum, E. T., Detroit, Mich.
Champion Iron Co., Kenton, O.
Field-Lange Wire & Metal Co., St. Louis.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Mast, Foot & Co., Springfield, O.
The Van Dorn Iron Works Co., Cleveland, O.
- Joist Leveler.**
Columbia Mfg. Co., Cincinnati, O.
- Keys.**
Wollensak, J. F., Chicago, Ill.
- Ladders.**
Davies, Chas. & Co., Williamsport, Pa.
- Lanterns.**
Detroit Fdy. Equipment Co., Detroit, Mich.
- Lamp Stoves.**
Cleveland Foundry Co., Cleveland, O.
- Lighting.**
Standard Lighting Co., Cleveland, O.
- Lanterns.**
Dietz, R. E. & Co., 60 Laight St., N. Y.
Steam Gauge & Lantern Co., Syracuse, N. Y.
- Lathes.**
Ferdinand Falls Co., 98 Reade, N. Y.
Sebastian Lathe Co., Cincinnati, O.
Sebastian, May & Co., Sidney, O.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Lathing, *Wire.***
Clinton Wire Cloth Co., Clinton, Mass.
J. W. Wire Cloth Co., Lebanon, N. J.
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Lawn Mowers.**
Bingham, W. Co., Cleveland, O.
Blair Mfg. Co., Springfield, Mass.
Chadborn & Coldwell Mfg. Co., New York, N. Y.
Champion Mfg. Co., Richmond, Ind.
- Coldwell Lawn Mower Co., Newburg, N. Y.**
F. & M. Mfg. Co., Richmond, Ind.
Hensley, M. O., Richmond, Ind.
Hale, W. E., Syracuse, N. Y.
Mast, Foot & Co., Springfield, O.
Stearns, E. C. & Co., Syracuse, N. Y.
Supple Hdw. Co., Phila., Pa.
Surplus, Dunn & Alder, 97 Chambers St., N. Y.
Wills in Whiteley & Co., Springfield, O.
- Lawn Rakes.**
Gibbs Mfg. Co., Canton, O.
Graham, John H. & Co., 111 Chambers St., New York.
Schaeffer & Co., Dayton, Ohio.
- Lawn Sprinklers.**
Blair Mfg. Co., Springfield, Mass.
Bonnette Arc Lawn Sprinkler Co., Bay City, Mich.
Ette & Henger Mfg. Co., St. Louis, Mo.
- Lawn Sweepers.**
Lape, W. E., Syracuse, N. Y.
- Lawn Swings.**
Davies, Chas. & Co., Williamsport, Pa.
- Lemon Squeezers.**
Ripley Mfg. Co., Unionville, Conn.
- Letter Boxes.**
Merriam Mfg. Co., Durham, Conn.
- Letters, *Paper.***
Tablet & Ticket Co., Chicago, Ill.
- Levels.**
Davis & Cook, Watertown, N. Y.
Richardson, C. F., & Son, Athol, Mass.
- Locks & Knobs, *Manufacturers of.***
Deitz, A. E., 97 Chambers, N. Y.
Reading Hdw. Co., Reading, Pa.
Romer & Co., Newark, N. Y.
Russell & Erwin Mfg. Co., N. Y. City.
Sargent & Co., 37 Chambers, St., N. Y.
Smith & Egge Mfg. Co., Bridgeport, Conn.
Warner Lock Co., Chicago, Ill.
Yale & Towne Mfg. Co., Stamford, Conn.
- Lubricators.**
Lunkenheimer Co., Cincinnati, Ohio.
- Machinery, *Am. Tool Works, Cleveland, Ohio.***
Barnes, W. F. & John, Rockford, Ill.
Becker, Jno. Mfg. Co., Fitchburg, Mass.
Bement, Miles & Co., Philadelphia, Pa.
Bertsch & Co., Cambridge City, Ind.
Bigelow, C. E., 20 B'way, N. Y.
Bignall & Keeler Mfg. Co., St. Louis.
Birmingham Iron Foundry, Birmingham, Conn.
Bliss, E. W. Co., Brooklyn, N. Y.
Briggs, Marvin, 12 Broadway, N. Y.
Brown & Sharpe Mfg. Co., Providence, R. I.
Carlin's Sons, Thos., Allegheny, Pa.
Clapp, Geo. M., 47-7 Cortlandt, N. Y.
Coulter & McKenzie Mch. Co., Bridgeport, Conn.
Cruikshank, D. B., Providence, R. I.
Davis, W. P., Rochester, N. Y.
Detrick & Harvey Mch. Co., Baltimore, Md.
Fitchburg Mch. Works, Fitchburg, Mass.
Garvin Mch. Co., Laight & Canal Sta.
Gould & Eberhardt, Newark, N. J.
Harrington, E. Son & Co., Phila.
Henderson Machine Tool Co., Phila.
Henderson Machine Co., Torrington, Ct.
Henley Mch. Tool Works, Richmond, Ind.
Hill, Clarke & Co., Boston, Mass.
Ingersoll Milling Machine Co., Rockford, Ill.
Johnson, Israel H., Jr., & Co., Phila.
Jones & Lamson Mch. Co., Springfield, Vt.
Lodge & Davis Mch. Tool Co., Cincinnati, O.
Lodge & Shipley Mch. Tool Works, Cincinnati, O.
Lovegrove & Co., Philadelphia, Pa.
McCabe, J. J., 68 Cortlandt, N. Y.
Machinists Supply Co., Rochester, N. Y.
Manville, E. J. Mch. Co., Waterbury, Conn.
National Machinery Co., Tiffin, Ohio.
Newark Mch. Tool Works, Newark, N. J.
New Haven Mfg. Co., New Haven, Conn.
New York Mach's Depot, N. Y.
Niles Tool Wks., 138 Liberty St., N. Y.
Pedrick & Ayer, Philadelphia, Pa.
Pittsburgh Mfg. Co., Pittsburgh, Pa.
Plack Bros., 120 Broadway, N. Y.
Poole, Robt. & Son Co., Baltimore, Md.
Powell Planer Co., Worcester, Mass.
Pratt & Whitney Co., Hartford, Conn.
Prentiss Tool & Supply Co., N. Y.
Reed, Jos. B., Cairo, Ill.
Scranton Supply & Mchry. Co., Scranton, Pa.
Sellers, Wm. & Co., Phila.
Seyfert's Sons L. F., Philadelphia, Pa.
Stephens, J. & Co., Cincinnati, O.
Stow Flexible Shaft Co., Ltd., Phila.
Toomey, Frank, Philadelphia, Pa.
Wetherill, Robert & Co., Chester, Pa.
Wilson, W. A., Rochester, N. Y.
Woodruff Mfg. Co., Hartford, Conn.
- Machinery for Hardware Manufacturing.**
Adt. Jno. & Son, New Haven, Conn.
- Machine Knives.**
Loring Coes & Co., Worcester, Mass.
Loyd, John, 558-562 Water St., N. Y.
- Machine Tools. —See Machinery.**
- Machine Work.**
Angus, C. H., Albany, N. Y.
- Machinists' Societies.**
Coffin & Leighton, Syracuse, N. Y.
Starrett, L. S., Athol, Mass.
- Machinists' Tools and Supplies.**
Brown & Sharpe Mfg. Co., Providence, R. I.
King, J. M. & Co., Waterford, N. Y.
Sellers, Wm. & Co., Phila.
- Mallets.**
N. Y. Mallet & Handle Works, N. Y.
- Mangers.**
Worthley's Broad Gauge Iron Stall Works, Boston, Mass.
- Manufacturing Sites.**
Chicago, Milwaukee & St. Paul R. R., Chicago, Ill.
Illinois Central R. R. Co., Chicago, Ill.
- Measuring Tapes.**
Lufkin Rule Co., Saginaw, Mich.
- Meat Cutters.**
Enterprise Mfg. Co., Philadelphia, Pa.
- Metals.**
Pearling, Wm. S., 100 Chambers, N. Y.
Hendricks Bros., 49 Cliff, N. Y.
Naylor & Co., 45 Wall, N. Y.
- Metal Brokers.**
American Metal Co., N. Y.
- Metalurgists.**
Britton, J. Blodgett, Phila.

- Metal Saws.**
Ehrhardt, Gastave & Sons, Pittsburg & C. Co., Chicago, Ill.
- Milling Machines.**
Ingersoll Milling Machine Co., Rockford, Ill.
- Mining Knives.**
Palmer Hdw. Mfg. Co., Troy, N. Y.
- Mine Lamps.**
Darby, Edw. & Sons, Phila., Pa.
Leonard, B. E., Scranton, Pa.
Leonard, F. S., Scranton, Pa.
- Mining Machinery.**
Fraser & Chalmers, Chicago, Ill.
- Mining Screens.**
Harrington & King Perforating Co., Chicago, Ill.
- Minnow Traps.**
Howard & Morse, 45 Fulton, N. Y.
- Model Builder.**
Wier, C. J. & Co., 106 Liberty St. N. Y.
- Molding Sand.**
Chicago Foundry Supply Co., Chicago, Ill.
- Motors.**
Overmayer, S. Co., Cincinnati, O.
Paxson, J. W. & Co., Phila.
Whitehead Bros. Co., 517 W. 15th St. N. Y.
- Motors, Water and Electric.**
Thomson, Houston Motor Co., Boston, Mass.
- Nail Machinery.**
Pittsburg H. Mfg. Co., Pittsburg, Pa.
- Nails (Cut) and Spikes.**
Borden & Lovell, 70 West, N. Y.
Cumberland Nail & Iron Co., Phila.
Oxford Iron Co., 81 Washington, N. Y.
Pottstown Iron Co., Pottstown, Pa.
Riverside Iron Works, Wheeling, W. Va.
Stebbins, C. J., 108 Reade, N. Y.
- Nickel Platers' Supplies.**
Eddy Electric Mfg. Co., Windsor, Conn.
Hanson & Van Winkle Co., Newark, N. J.
- Oil.**
Zucker & Levent Chemical Company, 10 to 14 Grand St., N. Y.
- Orway Shapes, Rollers of.**
Rowland, William & Harvey, Frankford, Philadelphia
- Part Machines.**
Dunham Nut Mch. Co., Unionville, O.
- Nuts, Bolts, &c., Makers of.**
American Bolt Co., Lowell, Mass.
American Screw Co., Providence, R. I.
Blake & Johnson, Waterbury, Conn.
Haskell, Wm. H. Co., Pawtucket, R. I.
Port Chester Bolt and Nut Co., Port Chester, N. Y.
- Oil Cans and Lubricators.**
Russell, Burdall & Ward, Port Chester, N. Y.
- Oil Cans and Lubricators.**
Sternbergh, J. H. & Son, Reading, Pa.
Wilson, J. Fred., Worcester, Mass.
Wm. H. Haskell Co., Pawtucket, R. I.
- Oil Cans and Lubricators.**
Sherwood Mfg. Co., Buffalo, N. Y.
- Oil and Grease Cans.**
Lunkenheimer Co., Cincinnati, Ohio.
- Oil Stones.**
Pike Mfg. Co., Pike Station, N. F.
- Orange Shears.**
Henry J. T. Mfg. Co., Hamden, Conn.
- Ore Sampling Machines.**
Fraser & Chalmers, Chicago, Ill.
- Ores.**
Wister, Francis, Philadelphia, Pa.
- Or Shoes.**
Scranton Forging Co., Scranton, Pa.
Woodruff, Walter W. & Sons, Mt. Carmel, Conn.
- Packing.**
Billington, Jas. H. & Co., Phila., Pa.
Morris, Robt., St. Louis, Mo.
N. Y. Beltine & Packing Co. Ltd., N. Y.
- Packings.**
Ames Sward Co., Chicago, Mass.
Fram, E. T., Lancaster, Pa.
Hillebrand & Wolf, Phila., Pa.
Miller Lock Co., Philadelphia, Pa.
- Paint.**
Detroit Granulate Mfg. Co., Detroit, Mich.
Dixon, Jos. Crucible Co., Jersey City, N. J.
Garry Iron & Steel Roofing Co., Cleveland, O.
- Paint Burners.**
Dangler Stove & Mfg. Co., Cleveland, O.
- Patent Solicitors.**
Ashley, J. A., Washington, D. C.
Fitzgerald, S. C., Washington, D. C.
Hawson & Howson, Phila. & Washington.
Jenner, H. W. T., Washington, D. C.
Palne & Ladd, Washington, D. C.
Stocking, E. B., Washington, D. C.
- Peanut and Coffee Roasters.**
Olson, A. B., Kansas City, Mo.
- Perforated Metal.**
Clinton Wire Cloth Co., Clinton, Mass.
Harrington & King Perforating Co., Chicago, Ill.
- Phosphor Bronze.**
Phosphor Bronze Smelting Co., Limited, 612 Arch, Philadelphia.
- Phosphor Tin.**
Crescent Phosphorized Metal Co., Philadelphia, Pa.
- Pipe.**
Crosby Steam Gauge & Valve Co., Boston, Mass.
- Pipe and Mattocks.**
Halk & Naumann, 516 Pearl, N. Y.
- Pipe Drills.**
Plumb, Fayette K., Philadelphia, Pa.
- Pipe Iron.**
Houston, C. B. & Co., Philadelphia, Pa.
Mann, Edwin R., Philadelphia, Pa.
Montour Iron & Steel Co., Danville, Pa.
Naylor & Co., 45 Wall, N. Y.
Pickands, Brown & Co., Chicago, Ill.
Pilling & Crane, Philadelphia, Pa.
Samuel, Frank, Philadelphia, Pa.
Wheeling Steel & Iron Co., Wheeling, W. Va.
- Pipe Iron Storage.**
Am. Pig Iron Storage Warehouse Co., 44 Wall, N. Y.
- Pile Drills.**
Vulcan Iron Wks., Chicago, Ill.
- Pipe, Bent.**
National Pipe Bending Co., New Haven, Conn.
- Pipe Cutting and Threading Machines.**
Bignall & Keeler Mfg. Co., St. Louis, Mo.
Merrill Mfg. Co., Toledo, O.
Pancos & Maule, Philadelphia.
Saunders & Sons, D. Yonkers, N. Y.
- Pipe Grips.**
Frontis Vise Co., 44 Barclay, N. Y.
- Pipes, Fittings, &c., Makers of.**
McNab & Harlan Mfg. Co., N. Y.
- Pipe, Water and Gas, Makers of.**
Cumberland Nail & Iron Co., Phila.
Donaldson Iron Co., Emaus, Pa.
Riverside Iron Works, Wheeling, W. Va.
- Plane Irons, Manufacturers of.**
Buck Bros., Millbury, Mass.
- Planes, Manufacturers of.**
Stanley Rule & Level Co., N. Y.
- Plate Bending Rolls.**
Schneekloth, H. A., 530 W. 28th St., N. Y.
- Plate, Iron and Steel, Mfgs of.**
Atlas Iron & Steel Co., Bridgeport, O.
Lukens Iron & Steel Co., Coatesville, Pa.
Moorehead-McCleane Co., Pittsburgh, Pa.
Malvain & Soha, Herting, Pa.
Pottstown Iron Co., Pottstown, Pa.
Pottsville Iron & Steel Co., Pottsville, Pa.
- Singer, Nimick & Co., Pittsburgh, Pa.**
The Mahoning Valley Iron Co., Youngstown, O.
- Wellman Iron & Steel Co., Thurlow, Pa.**
Woodman Co., Philadelphia.
- Plating, Nickel, Brass and Silver.**
Angus, C. H. Albany, N. Y.
Shard Hdw. Co., Buffalo, N. Y.
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Plumbago.**
Chicago Fdy. Supply Co., Chicago, Ill.
- Polishing Machines.**
Watson & Stillman, 204 E. 43d, N. Y.
- Polishing Wheel.**
La Massena, C. E. & Co., Newark, N. J.
- Post Hole Diggers.**
Buckeye Mfg. Co., Union City, Ind.
Gibbs Mfg. Co., Canton, Ohio.
Graham, John H. & Co., 113 Chambers St., New York.
- Kohler, F. E. & Co., Canton, O.**
Wister, L. & H. Co., Philadelphia, Pa.
- Poultry Nettings.**
Barnum, E. T., Detroit, Mich.
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.
- N. J. Wire Cloth Co., Trenton, N. J.**
"Silver Finish."
- Powder.**
Lafin & Rand Powder Co., 29 Murray New York Powder Co., 62 Liberty St., N. Y.
- Power Hammers.**
Bradley & Co., Syracuse, N. Y.
Belden Mach. Co., New Haven, Conn.
Dienelt & Eisenhardt, Philadelphia.
Dupont Mfg. Co., St. Johnsbury, Vt.
Hackney Hammer Co., Cleveland, O.
Jenkins & Lingie, Bellefonte, Pa.
- Power Pumps and Shears.**
Easton, Geo. H. & Co., Boston, Mass.
Ferracute Mch. Co., Bridgeport, N. J.
- Presses, Dies, &c.**
E. W. Bliss Co., Brooklyn, N. Y.
Crosby, G. A. & Co., Chicago, Ill.
Ferracute Mch. Co., Bridgeport, N. J.
Stark Mch. & Tool Co., Buffalo, N. Y.
Stiles & Parker Press Co., Brooklyn, N. Y.
- Waterbury Mch. Co., Waterbury, Conn.**
"Presses, Power, makers of."
- Bliss, E. W. Co., Brooklyn, N. Y.**
Easton, Geo. H. & Co., Boston, Mass.
Hamman, E. J. Mch. Co., Waterbury, Ct.
Hendman, E. J. Mch. Co., Waterbury, Ct.
Stark Mch. & Tool Co., Buffalo, N. Y.
Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.
- Pulley Fixings.**
Foley, J. W. & Co., Cincinnati, O.
- Pulleys.**
Kaiser, Western Pin Co., Toledo, O.
Keeves Pulley Co., Columbus, O.
- Pulverizing Mill.**
Bradley Fertilizer Co., Boston, Mass.
- Pumping Machinery.**
Dean Bros. Steam Pump Works, Indianapolis, Ind.
Hooker-Collie Steam Pump Co., Chicago, Ill.
McGowan, J. H. & Co., Cincinnati, O.
Maslin, J. & Son, Jersey City, N. J.
Norwalk Iron Wks. Co., So. Norwalk, Conn.
- Southwark Fdy. & Mch. Co., Phila., Pa.**
Valley Pump Works, Easthampton, Mass.
- Worthington, Henry R., 86 & 88 Liberty St., N. Y.**
- Pumps, makers of.**
Bellevue Pump Co., Bellevue, Iowa.
Deming Co., Salem, O.
Douglas, W. B., Middletown, Conn.
Hick, W. C. & Co., Springfield, O.
Myers, F. E. & Bro., Ashland, O.
St. Joseph Pump Co., St. Joseph, Mo.
- Punches and Shears, Hand and Power.**
Cleveland Hdw. Co., Cleveland, O.
New Doty Mfg. Co., Janesville, Wis.
Stark Mch. & Tool Co., Buffalo, N. Y.
- Punching and Shearing Presses.**
E. W. Bliss Co., Brooklyn, N. Y.
Cockburn Barrow & Mch. Co., Jersey City, N. J.
Crosby, G. A. & Co., Chicago, Ill.
Schneekloth, H. A., 530 W. 28th St., N. Y.
Stiles & Parker Press Co., Brooklyn, N. Y.
- Wais & Roos, Punch & Shear Co., Cincinnati, Ohio.**
Waterbury Farrel Foundry and Mch. Co., Waterbury, Conn.
- Watson & Stillman, 204 E. 43d, N. Y.**
Ralls, Old and New.
- Hirb, L. K., Chicago, Ill.**
Perry, W. H. & Co., Providence, R. I.
Richards, J. H. & Co., Pittsburgh, Pa.
- Railway Supplies.**
Scully Steel & Iron Co., Chicago, Ill.
- Rat and Mouse Traps.**
Burditt & Williams, Boston, Mass.
Beyer, W. & Co., N. Y.
Ripley Mfg. Co., Unionville, Conn.
Waddell, J. M. Mfg. Co., Greenfield, O.
- Razors.**
Butcher, W. & S., 135 Duane St., N. Y.
Curley, J. & Bro., 6 Warren St., N. Y.
Electric Cutlery Co., 115 Chambers, N. Y.
Schmitz, E. H., 92 E. 2d St., N. Y.
Southington Cutlery Co., Southington, Conn.
- J. R. Torrey Razor Co., Worcester, Mass.**
- Refrigerators.**
Challenge Corn Planter Co., Grand Rapids, Mich.
Pierce, Geo. N. & Co., Buffalo, N. Y.
- Refrigerator Door Fasteners.**
Conroy, P. J. & Co., Philadelphia.
- Rivets.**
Blake & Johnson, Waterbury, Conn.
Burden Iron Co., Tr. Y. N. Y.
Cobb & Drew, Plymouth, Mass.
Henderson, Jas. S., 165 Green St., N. Y.
Plymouth Mills, Plymouth, Mass.
- Sternbergh, J. H. & Son, Reading, Pa.**
Townsend, W. P. & Co., New Brighton, Pa.
- Riveting Machines.**
Adt, Jno. & Sons, New Haven, Conn.
- Rock Drills.**
Penna. Diamond Drill & Mfg. Co., Birdsboro, Pa.
Rand Drill Co., 23 Park Place, N. Y.
- Rolling Mill Machinery.**
Birmingham Iron Fdy., Birmingham, Conn.
Leach, The Lloyd Co., Youngstown, O.
Loebach Foundry & Mch. Co., Pittsburgh, Pa.
Mahoning Fdy. & Mch. Co., Danville, Pa.
Morgan Construction Co., Worcester, Mass.
Rabbon-Rea Mfg. Co., Pittsburgh, Pa.
Totten & Hogg Iron and Steel Fdy. Co., Pittsburgh, Pa.
Waterbury Farrel Foundry & Mch. Co., Waterbury, Conn.
- Roll Lathes.**
Totten & Hogg Iron and Steel Fdy. Co., Pittsburgh, Pa.
- Rolls, Chilled, Sand and Steel.**
Booth, The Lloyd Co., Youngstown, O.
Chicago Foundry Co., Chicago, Ill.
Garrison, A. Fdy. Co., Pittsburgh, Pa.
Johnson Foundry Co., Johnstown, Pa.
Seaman, Sleeth & Black, Pittsburgh, Pa.
Totten & Hogg Iron and Steel Fdy. Co., Pittsburgh, Pa.
- Roofing.**
Berlin Bridge Co., E. Berlin, Conn.
Boston Bridge Works, Boston, Mass.
Cambridge Roofing Co., Cambridge, O.
Cincinnati Corrugating Co., Piqua, O.
Johns, H. W. Mfg. Co., 87 Maiden Lane
- Rope.**
Travers Bros. Co., 107 Duane St., N. Y.
Rope and Cable Goods Co., West Troy, N. Y.
Covert's Saddlery Wks., Farmer, N. Y.
- Rubber Goods.**
Canfield, H. O., Bridgeport, Conn.
- Rules, Manufacturers of.**
Lufkin Rule Co., Saginaw, Mich.
Standard Tool Co., Athol, Mass.
Sullivan Rule & Level Co., 29 Chambers, N. Y.
- Sad Irons.**
Cleveland Fdy. Co., Cleveland, O.
Universal Sad Iron Co., Milwaukee, Wis.
- Sand Paper.**
Baeder, Adamson & Co., Phila., Pa.
- Sash Balance.**
Caldwell Mfg. Co., Rochester, N. Y.
Huganin, R. E. W. F. Mfg. Co., Hartford, Conn.
Pullman Sash Balance Co., Rochester, N. Y.
- Stewart & Baker, Rochester, N. Y.**
Sash and Sash Chasers.
- Morton, Thos., 65 Elizabeth, N. Y.**
Ossawon Mills Co., Norwich, Conn.
Samson Cordage Works, Boston, Mass.
Smith & Egge, Mfg. Co., Bridgeport, Conn.
- Sash Holders.**
Motley, Peter, Philadelphia, Pa.
- Saw Chains.**
Campbell Safety Lock Co., Cleveland, Ohio.
- Ives, H. B. & Co., New Haven, Conn.**
Sash Pulleys.
- Empire Portable Forge Co., Lansingburgh, N. Y.**
Patterson Hardware Mfg. Co., Troy, N. Y.
- Saw Weights.**
Brown, E. E. & Co., Philadelphia, Pa.
- Saws, Makers of.**
Atkins, E. C. & Co., Indianapolis, Ind.
Disston, Henry & Sons, Phila., Pa.
Jennings, E. & Co., 97 Chambers, N. Y.
Kendall Saw Co., 98 Reade St., N. Y.
Richardson Bros., Newark, N. J.
Simonds Mfg. Co., Fitchburg, Mass.
- Saw Sets.**
Kohler, F. E. & Co., Canton, Ohio.
Taintor Mfg. Co., 84-86 Chambers, N. Y.
Lloyd, W. J. Mfg. Co., Phila., Pa.
- Scales, makers of.**
Buffalo Scale Co., Buffalo, N. Y.
Chatillon, John & Sons, 85-89 Cliff, N. Y.
Osgood & Co., Binghamton, N. Y.
- Scrapers, Road.**
Sidney Steel Scraper Co., Sidney, O.
- Screen Door Frames.**
Kelley, W. C., Greenville, O.
- Screening, Door and Window.**
Phillips, A. J. & Co., Fenton, Mich.
Queen Anne Screen Co., Burlington, Vt.
- Screen Wire Holders.**
Hosford, Jno., Monroeville, O.
- Screw Cutting Machinery.**
Wills Bros. & Co., Greenfield, Mass.
Wills & Russell Mfg. Co., Greenfield, Mass.
- Screw Drivers.**
Alford & Berkele Co., 75 Chambers St., N. Y.
Brown, R. H. & Co., New Haven, Conn.
Carpenter, C. O., Chicago, Ill.
Canfield Tool Co., Reading, Pa.
Gay & Parsons, Augusta, Me.
Mayhew, H. H. Co., Shelburne Falls, Mass.
- Screw Plate and Pipe Cutter.**
Jarecki Mfg. Co., Erie, Pa.
- Screws, Makers of.**
American Screw Co., Providence, R. I.
Blake & Johnson, Waterbury, Conn.
Wm. H. Haskell Co., Pawtucket, Miles, F. S., 205 Quarry, Philadelphia.
National Screw & Tack Co., Cleveland, Ohio.
- Reynolds & Co., New Haven, Conn.**
Westchester Machine Screw Co., Worcester, Mass.
- Seroll Saws.**
Barnes, W. F. & John, Rockford, Ill.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Seythe Stones and Whetstones.**
Pike Mfg. Co., Pike Station, N. Y.
Walters, Wm. & Co., B'way, N. Y.
Huron Grindstone Co., Port Austin, Mich.
- Shafting, Makers of.**
Cresson, Geo. V., Co., Philadelphia, Pa.
Fairmont Mch. Co., Philadelphia, Pa.
Fitzsimons & Co., Cleveland, Ohio.
Sellers, Wm. & Co., Inc., Phila., Pa.
Stow Mfg. Co., Binghamton, N. Y.
- Shaped Iron and Steel, Manufacturers of.**
Atlas Iron & Steel Co., Bridgeport, O.
Allentown Rolling Mill, Phila.
Belleville Steel Co., St. Louis, Mo.
Illinois Steel Co., Chicago, Ill.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
- Passaic Rolling Mill Co., Paterson, N. J.**
Pottsville Iron & Steel Co., Pottsville, Pa.
Roberts, A. P. & Co., Phila., Pa.
The Phoenix Iron Co., Phila., Pa.
- Shears and Scissors.**
Acme Shear Co., Bridgeport, Conn.
Seinische, R. Sons Co., Newark, N. J.
- Sheet Iron and Steel, Manufacturers of.**
Atlas Iron and Steel Co., Bridgeport, Cambridge Iron & Steel Co., Cambridge, Ohio.
Chess Bros., Pittsburgh, Pa.
Moorehead-McCleane Co., Pittsburgh, Pa.
Pearson & Co., 74-76 West St., N. Y.
Belly, John W., Fort Hunter, P. O., Pa.
Singer, Nimick & Co., Ltd., Pittsburgh, Pa.
The Mahoning Valley Iron Co., Youngstown, O.
Alan Wood Co., Philadelphia.
W. Dewees Wood Co., McKeesport, Pa.
- Sheet Zinc.**
Mathlessen & Hegeler Zinc Co., La Salle, Ill.
- Shipping Blanks.**
Barlow Bros., Grand Rapids, Mich.
- Shoes and Dies.**
Chrome Steel Works, Brooklyn, N. Y.
- Shutter Bowers.**
Tyson & Zimmerman, Frederick, Md.
- Sinks.**
Douglas, W. & B., Middletown, Conn.
- Skates, Ice.**
Dane, Stoddard & Kendall, Boston, Mass.
Underhill, Clinch & Co., 91 Chambers St., New York.
Winslow, Sam'l., Skate Mfg. Co., Worcester, Mass.
- Skates, Roller.**
Hendley, M. C., Richmond, Ind.
Union Hardware Co., Torrington, Conn.
Winslow, Sam'l., Skate Mfg. Co., Worcester, Mass.
- Skylights.**
Plenty Horticultural & Skylight Wks., 145 Liberty St., N. Y.
- Smelting Works.**
Cresson, Paul S., 740 S. Broad, Phila.
- Speaking Tubes.**
Ostrander, W. R. & Co., N. Y.
Wollensak, J. F., Chicago, Ill.
- Specialties, Pat. Articles.**
Kingslow, O., Cleveland, O.
- Speed Indicators.**
Church & Slight, 105 Fulton St., N. Y.
- Spelter.**
Mathlessen & Hegeler Zinc Co., La Salle, Ill.
- Spoons and Forks.**
Holmes & Edwards Silver Co., Bridgeport, Conn.
Rogers, The Wm. Mfg. Co., Hartford, Conn.
- Sporting Goods.**
Hartley & Graham, 313-315 E'way, N. Y.
- Spring.**
Am. Spiral Spring Co., Pittsburg, Pa.
Cary, Alanson, 242 W. 28th St., N. Y.
Dunbar Bros., Bristol, Conn.
Haley Mfg. Co., Concord, N. H.
Miller & Van Winkle, Brooklyn, N. Y.
Morgan Spring Co., Worcester, Mass.
Nourse, Fred., 166 W. 27th St., N. Y.
Sabin Machine Co., Montpelier, Vt.
Washburn & Moen Mfg. Co., Worcester, Mass.
Wolf, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
- Spring Hinges.**
Bardsley, J., 149 & 151 Baxter St., N. Y.
Chicago Spring Butt Co., Chicago, Ill.
Pullman Sash Balance Co., Rochester, N. Y.
- Shepard Hdw. Co., Buffalo, N. Y.**
Stover Mfg. Co., Freeport, Ill.
Van Wagoner & Williams Co., 14 Warren St., N. Y.
- Spring Keys and Cotter's.**
Jencks Mfg. Co., Pawtucket, R. I.
Whitman & Barnes Mfg. Co., Syracuse, N. Y.
- Stamped Ware.**
Am. Stamping Co., 104 & 106 John St., New York.
- Stamping Works.**
Am. Stamping Co., Cleveland, O.
Cleveland Stamping & Tool Co., Cleveland, O.
- Staples.**
Cobb & Drew, Plymouth, Mass.
Titchener, E. H. & Co., Binghamton, N. Y.
- Steam Gauges.**
Ashley, J. T. Mfg. Co., 111 Liberty St., N. Y.
Bristol Mfg. Co., Waterbury, Conn.
- Steam Hammers, &c., Makers of.**
Dienelt & Eisenhardt, Philadelphia.
Dudgeon, Richard, 24 Columbia Street, N. Y.
- Steam Heating.**
Webster, Warren & Co., Phila., Pa.
Senn Separators, New York, N. Y.
Garbert Mfg. Co., 32 Cortland St., N. Y.
Harris, N. Safety Boiler Wks., Phila., Pa.
- Steel Balls.**
Grant Anti-Friction Ball Co., Fitchburg, Mass.
- Steel, Cold Rolled Strip.**
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel Figures and Alphabets.**
Krogerud, W., 61 Fulton, N. Y.
- Steel Importers.**
Abbott, Jere & Co., N. Y. and Boston.
Hobson, Francis, Seaman & Co., 99 John St., N. Y.
Jewett, Wm. & Sons, Sheffield, England, or 91 John, N. Y.
Lindsay, Jas. G. & Co., Philadelphia.
Milne, A. & Co., 1 Broadway, N. Y.
Newton & Shipman, 83 John, N. Y.
Page, Newell & Co., Boston, Mass.
Wetherell Bros., 100 Liberty St., N. Y.
Walters, Wm. & Co., B'way, N. Y.
Wolf, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.
- Steel (Mushet's Special).**
Jones, B. M. & Co., Boston.
- Steel Manufacturers.**
Atlas Iron & Steel Co., Bridgeport, O.
Bethlehem Iron Co., Bethlehem, Pa.
Baker, Herman & Co., 103 Duane St.
Buffalo Steel Foundry, Buffalo, N. Y.
Carbon Steel Co., Pittsburgh, Pa.
Chester Steel Castings Co., Phila., Pa.
Chrome Steel Works, Brooklyn, N. Y.
Crescent Steel Co., Pittsburgh, Pa.
Frankford Steel Co., Philadelphia.
Gautier Steel Department or Cambria Iron Co., Johnstown, Pa.

Hobson, Francis, Seaman & Co., 97 John St., N. Y.
 Illinois Steel Co., Chicago, Ill.
 Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.
 Jones, B. M. & Co., Boston, Mass.
 Kayser, Ellison & Co., Sheffield, Eng.
 La Belle Steel Co., Pittsburgh, Pa.
 Lukens Iron & Steel Co., Coatesville, Pa.
 Mochhead-McCleane Co., Pittsburgh, Pa.
 Moss, F. W., 88 John, N. Y.
 Naylor & Co., 45 Wall, N. Y.
 Pennsylvania Steel Co., Steelton, Pa.
 Pierson & Co., 24-27 West, N. Y.
 Pottsville Iron and Steel Co., Pottsville, Pa.
 Reilly, J. W., Fort Hunter P. O., Pa.
 Rowland, Wm. & Harvey, Frankford Philadelphia.
 Singer, Nimick & Co., Pittsburgh.
 Stanley Works, New Britain, Conn.
 Steel & Iron Improvement Co., Pittsburgh, Pa.
 Taylor Iron & Steel Co., High Bridge, N. J.
 Wordlaw, S. & Co., Sheffield, Eng.
 Wetherell Bros., 93 Liberty, N. Y.
 Wheeling Steel & Iron Co., Wheeling, W. Va.
 Wilmot & Hobbs Mfg. Co., Bridgeport Conn.
Steel, Manufacturers' Agents.
 Barnes, C. & Co., Philadelphia, Pa.
 Corning, Edw. & Co., 29 B'way, N. Y.
Steel Rails, Manufacturers of.
 Bethlehem Iron Co., S. Bethlehem, Pa.
 Cambria Iron Co., Johnstown, Pa.
 Illinois Steel Co., Chicago, Ill.
 Penna. Steel Co., Steelton, Pa.
 Montour Iron & Steel Co., Danville, Pa.
 Riverside Iron Wks., Wheeling, W. Va.
Steel Spiral Springs, manufs.
 Chadlton, John & Sons, N. Y.
 Roland, Wm. & Harvey, Frankford
 Wolff, R. H. & Co., Ltd., 118 Street and Harlem River, N. Y.
Steel, Tools.
 Frankford Steel Co., Philadelphia, Pa.
 Jessop, Wm. & Sons, Sheffield, England, 91 John, N. Y.
 La Belle Steel Co., Pittsburgh, Pa.
Step Ladders.
 Bicycle Step Ladder Co., Chicago, Ill.
 Croissant, M., Albany, N. Y.
Stocks and Dies.
 Armstrong Mfg. Co., Bridgeport, Conn.
 Billings & Spencer Co., Hartford, Conn.
 Butterfield & Co., Derby Line, Vt.
 Hart Mfg. Co., Cleveland, O.
 Saunders' Sons, D., Yonkers, N. Y.
 Wells Bros. & Co., Greenfield, Mass.
 Wiley & Russell Mfg. Co., Greenfield Mass.
Stove Linings.
 Ostrander Fire Brick Co., Troy, N. Y.
Stove Pipe Thimbles.
 Cheney, S. & Son, Manlius, N. Y.
Stove Trimings.
 Troy Nickel Works, Troy, N. Y.
Street Lamps.
 Dietz, R. E. Co., 60 Light St., N. Y.
 Steam Gauge & Lantern Co., Syracuse N. Y.
Strops.
 Electric Cutlery Co., 113 Chambers, N. Y.
 J. R. Torrey & Co., Worcester, Mass.
Strapping Machines.
 Schmitz, E. Lothar, 92 Reade St., N. Y.
Structural Iron Work.
 Berlin Iron Bridge Co., East Berlin, Conn.
 Boston Bridge Wks., Boston, Mass.
 Wrought Iron Bridge Co., Canton, O.
Sulphuric Acid.
 Matthiessen & Hegeler Zinc Co., La Salle, Ill.
Tack Hammers.
 Smethport Mch. Co., Ltd., Smethport Pa.
Tacks, Brads, Staples, &c.
 Atlas Tack Corporation, Boston, Mass.
 A. Field & Sons, Taunton, Mass.
 Cobb & Drew, Plymouth, Mass.
 Grand Crossing Tack Co., Grand Cross Ing, Ill.
 Nat. Screw & Tack Co., Cleveland O.
 Phillips, E. & Sons, South Hanover, Plymouth Mills, Plymouth, Mass.
 Trafant, W. E., Whitman, Mass.
Traps and Dies.
 Fatterfield & Co., Derby Line, Vt.
 Manning, Maxwell & Moore, 111 Liberty, N. Y.

Wells Bros. & Co., Greenfield, Mass.
 Wiley & Russell Mfg. Co., Greenfield, Mass.
Testing Laboratories.
 Richie Bros. Testing Mch. Co., Philadelphia.
Testing Machines.
 Richie Bros. Testing Mch. Co., Phila.
Theatrical Hardware.
 Wollensak, J. F., Chicago, Ill.
Thill Springs.
 Frost Thill Spring Co., Boston, Mass.
 Sabin Machine Co., Montpelier, Vt.
Time Record.
 Scattergood, H. W., Phila., Pa.
Tinners' Hardware.
 Berger Bros., Philadelphia, Pa.
Tin Plate Machinery.
 Lloyd Booth Co., Youngtown, Ohio.
Tinware.
 Am. Stamping Co., 104 & 106 John St., Matthal, Ingram & Co., Baltimore, Md.
Toe Calks, Steel.
 Burke, P. F., Boston, Mass.
Tool Chests.
 Am. Tool Co., 200 W. Houston St., N. Y.
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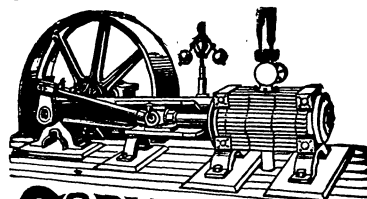
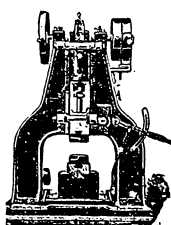
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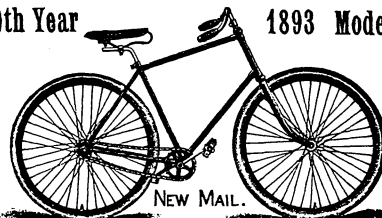
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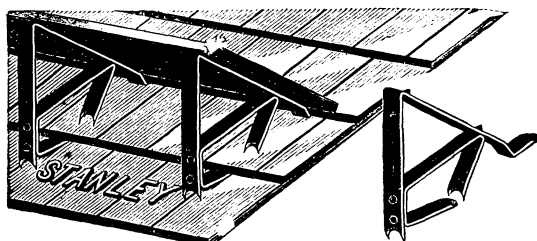
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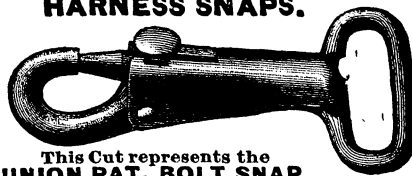
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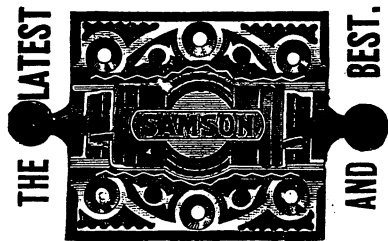
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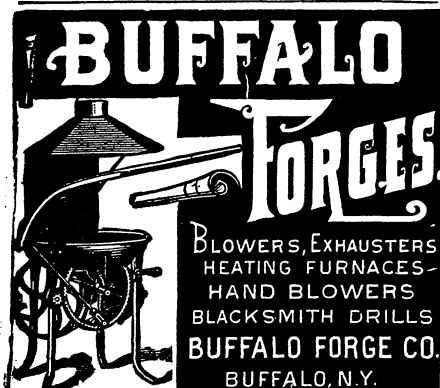
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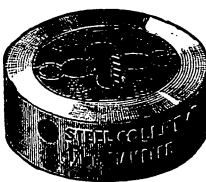
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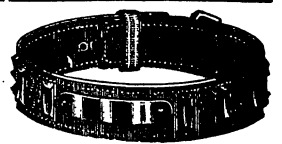
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THE IRON AGE

THURSDAY, MARCH 2, 1893.

Electricity in the Works of Fraser & Chalmers.

In *The Iron Age* of October, 20, 1892, under the heading, "Electric Motors in a Machine Shop," we described and fully illustrated the new erecting shop of the De La Vergne Refrigerating Machine Company of New York. In the introduction it was then stated that while we had previously noted the employment of electric motors in isolated cases, this, "we believe, is the first case on record where a machine shop equipped with tools requiring large units of power is run exclusively with electric motors." We now have the privilege of describing the electric power distribution in the works of Fraser & Chalmers of Chicago. This company are among the largest manufacturers of mining machinery, steam engines, boilers, &c., in the country, and their new works are equipped entirely with electric power, there being a total of some 360 horsepower in motors distributed through the various departments.

General Description of the Works.

The new buildings already completed and in operation, although on a very large scale, are, in reality, but the nucleus of what will ultimately be an immense plant. They are located on the north side of West Twelfth street, extending west from Rockwell street, upon which are the tracks of the Pan Handle, Chicago, Burlington & Quincy and Chicago & Northwestern railways, and by belt-line connections of other systems. On the north, on line of Taylor street, are the tracks of the Wisconsin Central and Northern Pacific railways. This location, therefore, affords most excellent transportation facilities, as direct shipments may be made to and from any point. The present buildings

comprise the foundry, cleaning shop, pattern rooms, pattern shop, large fire-proof room for patterns in use, shafting shop, storeroom and offices. There is also an isolated pump house containing the artesian-well pump, air compressor and fire

a distance of about 550 feet, giving a continuous front on West Twelfth street of that length, and about 240 feet on Washtenaw avenue. On the north the space between buildings and Northern Pacific Railroad is at present used as yard room.

On the west side of Washtenaw avenue, about 300 feet north from Twelfth street, is the boiler shop—extending north about 400 feet and west 130 feet. The dimensions of main building, containing foundry, &c., are: length, 550 feet; width, 150 feet, with two wings of about 75 x 90 feet, and 90 x 90 feet, respectively.

The foundry proper is 390 x 150 feet. The equipment is very complete and embodies the latest improvements in facilities and methods. An electric traveling crane, by the Morgan Engineering Company, traverses the entire length of the molding floor. Its lifting capacity is 25 tons. There are also a Yale & Towne electric jib crane, a hydraulic jib crane of 32 feet radius, and two hand power jib cranes. Centrally located are the core room and core ovens, the latter being heated by petroleum from burners using compressed air blast instead of steam, as being better adapted to drying purposes. There are two cupolas—one of 7 feet diameter, with capacity of 13 tons per hour; and the other, 5 feet, for 5 to 6 tons. The floor is provided with 8 anchor plates, 6 x 10 feet, weighing each about 4000 pounds, also two iron lined pits 6 feet diameter by 10 feet deep, and 8 feet diameter by 12 feet deep, for loam work. The cupola blast is furnished by a Root blower driven by a 65 horse power electric motor. It is the intention to supplement the hoisting equipment by the

addition of two Morgan travelers of 10 and 15 tons capacity, to be, in all respects, similar to the one now in use.

The pattern shop is located on the second floor of the western wing, and is 75 x 90 feet. The facilities, in the shape of

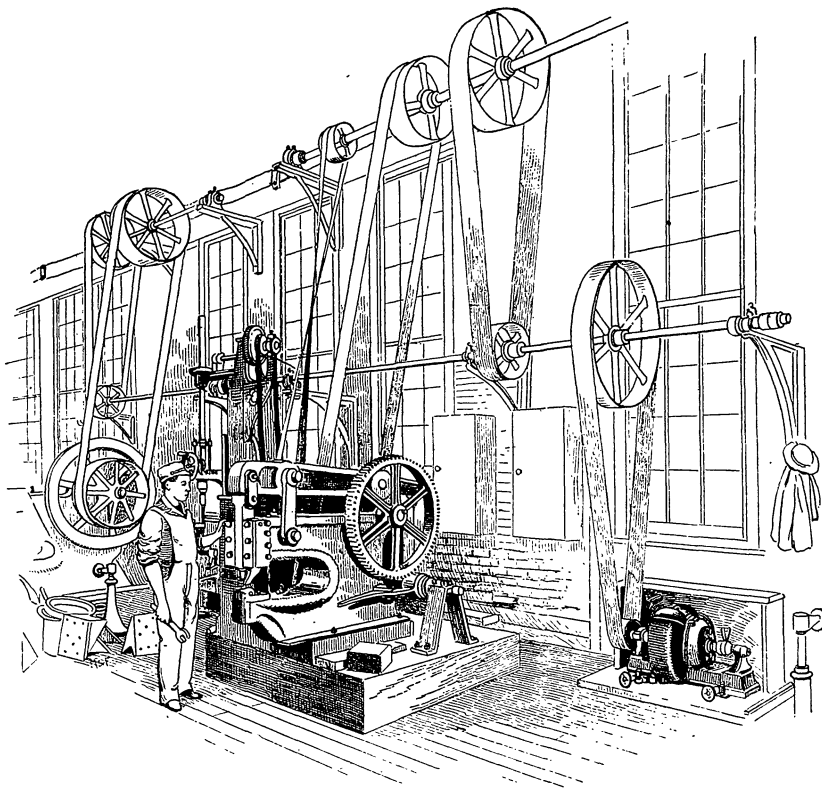


Fig. 1.—Electric Motor Driving Shear, Upright Drill and Punch.

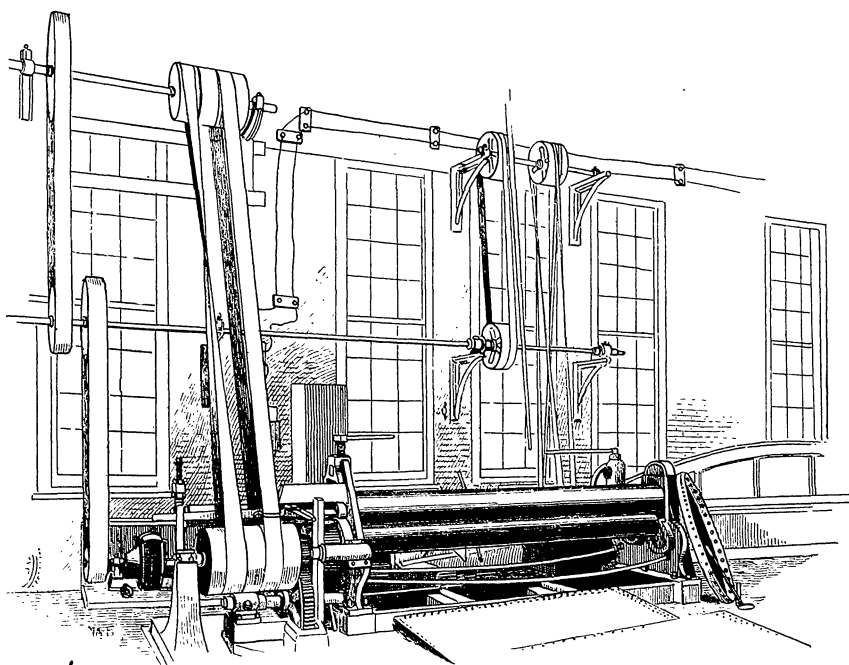


Fig. 2.—Electric Motor Driving 10-Foot Roll and 20-Foot Plate Planer.

ELECTRICITY IN THE WORKS OF FRASER & CHALMERS.

pump. Directly north of the foundry is the power house—a large one-story building divided by a transverse fire wall into boiler room and engine room. These buildings occupy the entire space between Rockwell street and Washtenaw avenue,

machinery and time-saving conveniences, are very complete, and consist entirely of tools by the best makers. A very noticeable feature of this department is the exceptionally good light, which is so thoroughly diffused as to leave no portion of the room insufficiently provided. A fire wall separates the shop from the main building, which at this end is three stories high, to provide the large amount of space for properly classified pattern storage. An electric elevator, having large platform, is located in a central position and gives convenient access to the several floors.

The temporary shafting shop, located beneath the pattern shop, is not yet in operation, but is expected to be ready shortly. It is provided with a short span traveler, which reaches the entire length of the floor. The storeroom and shop offices are also on this floor, to the west of shafting room and fronting on Washtenaw avenue.

In the power house the fire room contains a battery of six horizontal tubular boilers, all of which are oil fired, using steam blast for burners. The latter are considered satisfactory as to efficiency, and arrangements are now being made for evaporation tests to determine their comparative economy. There is also in course of construction a gas plant of novel description, which is designed to use the cheapest grade of fuel, and which, if found satisfactory, is intended to supersede the present system of oil firing. In the engine room are located the engines, dynamos and feed-water heater. A jack shaft, carried by floor stands, extends entirely across the width of the room, and from it the power is transmitted directly to the dynamos. The setting of the engines—two in number—is peculiar, they being placed parallel on opposite sides of the jack shaft, and driving the latter by independent belts and pulleys, thus having no means of maintaining any positive relation between the positions of the two cranks. They are Corliss engines, 14 x 42 inches, of Fraser & Chalmers make, and are especially noticeable on account of their high rotative speed, as compared with that of others of the Corliss type. By means of a radical improvement in the dash pots to the steam valves, the closure of the latter, after release, is as prompt and certain as if actuated by a positive motion, and the fact that they are able to work satisfactorily at 115 revolutions and give regulation sufficiently close for such trying duty as electrical transmission, would indicate a most important achievement. A system for separating and returning directly to boilers of the water of condensation in all steam pipes is in successful operation. The feed-water heater is of the Excelsior pattern, of combined heater and purifier. It delivers the water to boilers at or near 212°, and removes all except the most refractory of the impurities in solution, and practically all in suspension. The ampere and volt meters, &c., occupy a large portion of the wall space at back end of the room. They are made by the Western Electric Company.

The water from artesian well was found by analysis to be unsuitable for steam purposes, and the city water, therefore, is used. The well water, however, is used exclusively throughout the works for all other purposes, and is much liked by employees for drinking—many of them carrying it home for domestic use.

In the boiler shop, the equipment has not yet been entirely completed; but is, nevertheless, very extensive. A 15-ton Morgan electric traveler traverses the entire length of building, for a width of about 50 feet under the clear story. At the south end of shop are two Bement, Miles & Co. hydraulic riveters, one of 10 feet and the other 6 feet span. Each riveter is provided with a powerful hydraulic hoist, having vertical cylinders

and lift chain, led over the necessary sheaves suspended to bring the work into proper position. The pumps, accumulator and a single cylinder air compressor, are located in a corner of the building near the large riveter. An air pipe from the latter machine conveys compressed air the entire length of the shop, for operating the portable pneumatic riveters and Weatherston's pneumatic hoists, of which

work; also bending rolls, drills, &c. The flanging is at present done entirely by hand, but a machine for the purpose is now in course of construction, the furnace for which has been provided. In addition to the traveler, the facilities for transporting work and material are supplemented by three longitudinal and three transverse narrow-gauge tracks—21½-inch gauge—of 16 pound rails. At each of the nine

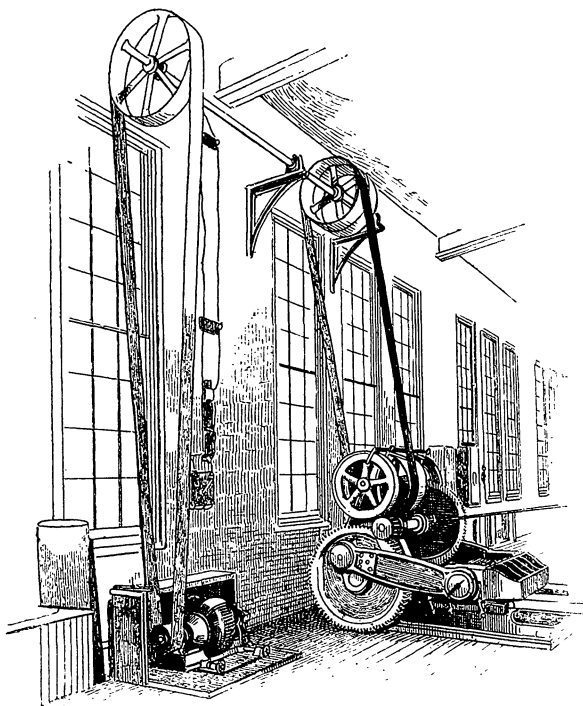


Fig. 3.—Electric Motor Driving Bulldozer.

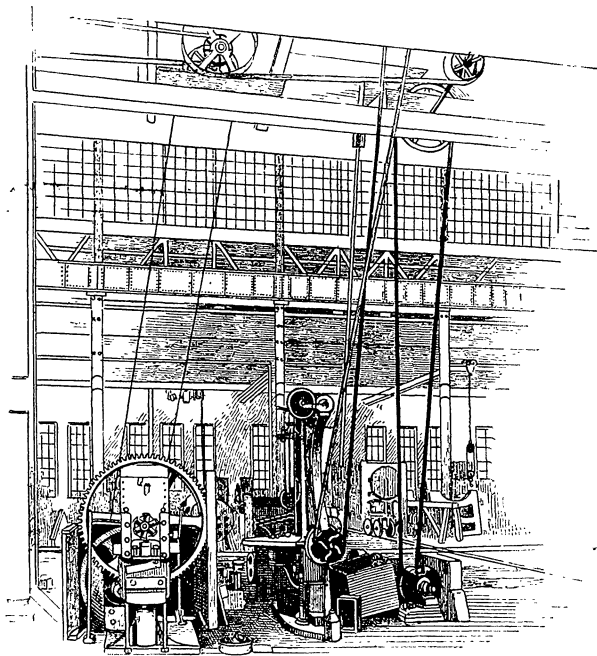


Fig. 4.—Electric Motor Driving Shear and Upright Drill.

ELECTRICITY IN THE WORKS OF FRASER & CHALMERS.

there are a large number in use for the handling of plates, &c., at the different machines. A 1½-inch oil pipe is also provided for furnishing oil fuel at any desired point in the building, though, at present, coal appears to be used exclusively in this department. Another use for compressed air is in operating the pneumatic calking tool—a great improvement both as to method and result, over the old-fashioned hand calking. There are a large number of punching and shearing machines, for both light and heavy

intersections is a turntable, so that any part of the floor may be reached by the trucks. A standard gauge switch track from the N. P. R. R. crosses the building at the center, and affords great convenience in loading boilers on cars by use of traveler. Hydrants and sewers are located at equidistant points, six in number, and at two of them is a supply of hot water under pressure for testing the boilers. At the northeast corner of the building are the blower and its motor, for furnishing blast for the furnaces, forges and rivet

fires. As in all other departments of the works, excellent provision is made for the comfort of employees.

The Sturtevant system of hot-blast heating is used, and by it the temperature is maintained at a comfortable point in the coldest weather and, at the same time, ample ventilation secured. Wash rooms

the plant, and forms a conspicuous landmark in the vicinity. As a rule, the visible smoke from it is conspicuous from its absence, particularly as some of its neighbors—a schoolhouse, for instance—are conspicuous the other way. Within a year it is expected that buildings will be completed for the several departments

buildings, as well as the distances between points where power is used. On this plan are also indicated the circuits now in operation and which, in the original installation, furnish current for the following motors, all of which are of the C. & C. type:

Foundry: One 65 horse-power, one 20 horse-power, two 10 horse-power, one $7\frac{1}{2}$ horse-power, five 5 horse-power, two 3 horse-power, three 1 horse-power.

Pattern shop: One 25 horse-power, one 20 horse-power, one 15 horse-power.

Boiler shop: Six 10 horse-power, seven 5 horse-power.

It will be noted that the power house is located away from the main buildings and near the center of the works. From the power house run three substantial circuits delivering current with a loss of from 2 per cent. to 5 per cent. to motors in the foundry, pattern shop and boiler shop. In the power house are two C. & C. 80 k.w. standard compound dynamos driven by two Fraser & Chalmers' Corliss engines. These dynamos are designed to deliver current at 250 volts regulating automatically for all loads, and supply power and incandescent lights for the entire works.

The three main circuits are brought to the switch board shown in Fig. 5 and are connected through double pole switches to the dynamo bus bars at the back of the switch board. Each circuit has its independent ammeter showing the power consumed in each department at all times.

A voltmeter with switch for connecting to either dynamo is mounted in the center of the board and regulators for changing the voltage if desired are placed immediately below, as shown.

The switch board is arranged to be enlarged as more circuits are required.

The motors throughout the shops are provided with automatic cut-off starting switches, so that when the current is cut off at the main switch board each motor is cut off from its circuit. This prevents the possibility of injury to motors from the current being suddenly thrown on them from the power house.

The perspective views, Figs. 1 to 4, indicate very clearly the methods of driving. In the first illustration a 10 horse-power motor is shown running a large bevel shear, upright drill and punch; next a 10 horse-power motor running a 10-foot boiler plate roll and a 20-foot plate planer; Fig. 3 shows a 10 horse-power motor running a Williams, White & Co.'s bulldozer, and Fig. 4 a 5 horse-power motor running a boiler plate shear and a large upright drill. Each motor operates one or more machines; when more than one, the machines are so placed that they can be driven from a short overhead shaft operated by the motor, as clearly shown in the engravings.

One advantage peculiar to this system is that the ammeters in the dynamo room show at all times the exact amount of power consumed by any particular circuit. Knowing the power required to run the machines on a circuit empty, the indication by the ammeter of the consumption of a greater power would indicate something wrong and an investigation would follow. An abnormal consumption of power would also be shown. This was illustrated in the case of the Root blower supplying the cupolas. The outlet valve was closed while the motor was running. The unusual demand for power on this circuit was noticed by the engineer in the dynamo room, who instantly threw the switch out, thereby saving possible damage. The electrical part of the equipment of this plant was installed by the C. & C. Electric Motor Company of New York.

Means are being devised to make the cod fisheries of Newfoundland more productive. Of late years they have been declining.

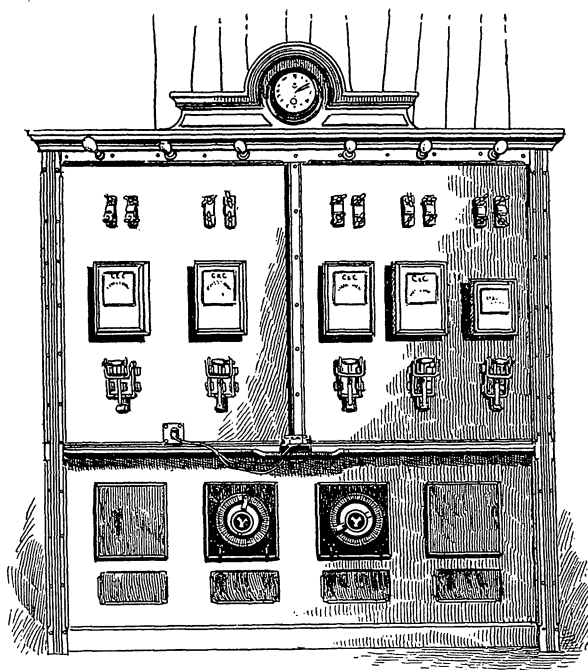


Fig. 5.—Switch Board.

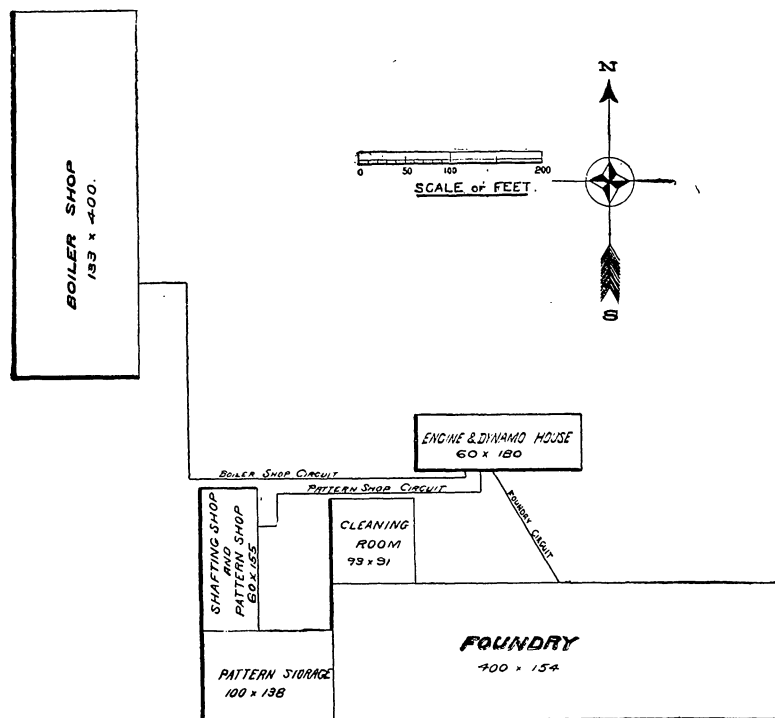


Fig. 6.—Map of Works.

ELECTRICITY IN THE WORKS OF FRASER & CHALMERS.

and water closets of the best sanitary designs are provided throughout the establishment. In point of construction the buildings are very substantial, being almost entirely of brick and iron. The window space is large and the rooms all exceedingly well lighted, and for hot weather the ventilation should be excellent. A brick smoke stack of unusually handsome design and symmetrical proportions is not the least noticeable feature of

still continued at the original location—Fulton and Union streets. They will comprise the machine, erecting, blacksmith, carpenter and shafting shops and the general offices, including, of course, the drafting rooms. These latter will be located at the northwest corner of West Twelfth street and Washtenaw avenue.

Electrical Equipment.

The ground plan, Fig. 6, gives a general idea of the arrangement and sizes of the

The Bettendorf Hollowsteel Wagon Axle.

Genuine novelties are comparatively rare, even in this prolific age of mechanical inventions. They are so rare that the invention to which this sketch is devoted will not fail to attract widespread attention, even among readers who are not directly interested either in the article or its use. A radically new departure has been made in the invention of a combined wagon axle, bolster and stakes of pressed steel to take the place of the usual style of wooden wagon parts which are now in common use. William P. Bettendorf of Davenport, Iowa, proprietor of the Bettendorf Hollowsteel Axle Works, is the inventor and manufacturer of the new article which was so much of a novelty in the Patent Office that his patents were allowed within a very few weeks after application. Illus-

material. Two sheets are used in the manufacture of an axle: one is pressed into shape to form the front and another the back, when they are firmly united and constitute the completed article. This is a rough description of their method of construction, which is as follows more in detail: The metal is first sheared to shape from the flat sheets, the shearing is so done as to leave plenty of metal for the ends of the axles and for the formation of the stakes to be turned up. During the same process of shearing, holes are punched in the sheets for riveting them together. The sheets are then shaped in a hydraulic press to the form required for the front and back of an axle, flanges being turned over for the bed of the bolster and the flat sides of the stakes. These fronts and backs are then placed together, and, while held under a hydraulic pressure of 300 tons to the square inch, are riveted in a manner original with Mr. Bettendorf and

flanged reach opening is of the standard size. Vertical corrugations in the bolster greatly add to its strength and also improve its appearance.

The axles, if they were simply made of sheet steel, might perhaps be weak at the collar of the bearing. They are therefore reinforced by the insertion of a bushing, which is welded in its place at the collar, and also forms an oil chamber, as shown in the broken section of the axle in Figs. 1 and 2. This oil chamber has suitable apertures to make the axle self oiling. The diameter and length of the axle bearings are the same as trade skeins of the same size, and they have case-hardened collars of special design, which prevent the accumulation of grease and dirt at the hub collars. The nuts and stake rings are of malleable iron. The axles are of proper pitch and gather for wheels with half-inch dish. These axles are made for use with the ordinary wooden wheels and



Fig. 1.—Combined Axle and Sand Board.

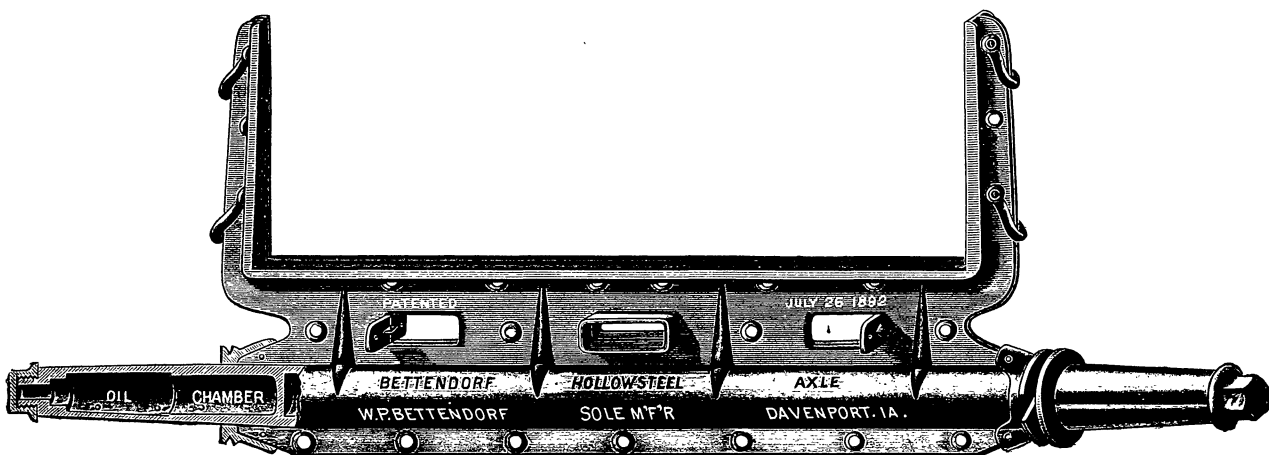


Fig. 2.—Combined Axle, Bolster and Stakes.

THE BETTENDORF HOLLOWSTEEL WAGON AXLE.

trations are herewith given of the wagon parts made by Mr. Bettendorf under his patents. Fig. 1 shows the combined axle and sand board. Fig. 2 shows a combined axle, bolster and stakes. Fig. 3 is a view of a combined bolster and stakes.

Those of our readers who are not familiar with the manufacture of wagons will appreciate the difference in construction of these wagon parts and wooden ones, when the statement is made that only six pieces of sheet steel are used, as against 107 separate pieces required in the construction of the wooden axles, sand board, bolster and stakes. All such parts as clips, bolts, nuts and rivets are avoided. The weight of the Bettendorf axle is also 25 per cent. less than that of the standard wooden one. Tests made in the works show that these axles are 25 per cent. stronger than the best wooden axles intended for the same service. The objects attained are thus greater durability, with a combination of lightness and strength, as well as the use of fewer separate parts.

The Bettendorf Hollowsteel axle is made of No. 11 mild sheet steel of the best quality, care being taken to secure first-class

also secured by patents. This system of riveting is illustrated in Fig. 4, which shows a cross section of the axle and bolster through some of the rivet holes. By this method of riveting the metal is drawn from one of the sheets through the hole in the other sheet and flanged over its entire circumference. This obviates the necessity of using separate rivets and causes the fastenings to be homogeneous parts of the whole. The union of the two steel sheets is thus almost as perfect as if they were welded, the axle being the only part left hollow.

These parts of wagons are so made as to be interchangeable with the regulation or standard wooden parts. Any jobber can carry them in stock, and if a man breaks a wooden wagon axle one of these can be put in its place in a very short time with no change in other parts of the wagon. No drilling of holes in the axle or bolster is necessary. The size of the hound openings in the bolster and the distance between them are the same as in standard wooden axles. The hounds are readily attached by bolts to lips punched from and forming a part of the plate. The

do not require special wheels. In all cases the sheets are coated with graphite paint before riveting them together, which renders them rust proof. After the axles are finished ready for use they are dipped in a coat of metallic paint to prevent them from rusting while stored or during shipment.

The machinery by which these axles and bolsters are manufactured was specially designed and built by Mr. Bettendorf. It consists of hydraulic presses, gas heating and welding furnaces, hydraulic forge and steam hammers, all adapted peculiarly to the purpose and rendering the manufacture of the axle simple and economical. The hydraulic shear for shearing the sheets is operated with 300 tons pressure, while the duplex press for forming the sheared sheets into shape is of 450 ton power. The gas furnace for heating axle ends is of original design. It is circular in form and vertical in construction. It receives the end of the axle, brings it to a welding heat in three minutes or less, and the forging is then done in dies by a small hydraulic press. The stakes are bent to the proper angle in a special shaping machine

after being heated in a gas furnace. Every operation is conducted with cold metal except the welding of the bearings and the bending of the stakes. The process is remarkably simple, owing to the perfection of the machinery and the price of the hollow steel axle has consequently been placed at about the same as that of the wooden axle. This competi-

sizes, however, will be manufactured hereafter, as the demand warrants or the condition of trade requires.

The South is now in confident expectation of having direct trade with Europe, so as to be able to compete in the exportation of grain. In answer to an appeal of

The Westinghouse-Edison Suits.

Another important decision in the Westinghouse-Edison cases was filed last week in the United States Circuit Court at Pittsburgh, by Judge Atchison. The Westinghouse Company are defendants in the case, in which a preliminary injunction was issued in December, 1892, to restrain the Westinghouse Company from infringing the second claim of the letters patent granted to Thomas A. Edison January 27, 1880, and from making, issuing or selling incandescent electric lamps of the kind described in the plaintiff's papers, and shown to be same as lamps which had been adjusted to infringe the second claim of said patent, and manufacture and sale of which were enjoined by the United States Circuit Court for the southern district of New York in the suits of the Edison Electric Light Company against the United States Lighting Company, and the Edison Electric Light Company *et al.*, against the Sawyer-Man Electric Company.

The Westinghouse Company did not resist the injunction that followed the decision of the courts mentioned, but on February 1, 1893, presented an affidavit setting forth that a lamp, the construction of which had been in progress before the allowance of the injunction, had been put upon the market after counsel for plaintiff had been notified. This lamp was claimed by the Westinghouse Company to be free from infringement, but the Edison counsel claimed otherwise. The Westinghouse Company then obtained a rule to have the plaintiffs show cause why the injunction should not be construed as claimed by the Westinghouse Company. Judge Atchison's decision is as follows:

"While we are quite prepared to accept the defendants' course in taking this rule as evidence of good faith to the Court, and as indicating a purpose to avoid even the appearance of a willful disobedience to our writ of injunction, yet, under the circumstances, think it would be going too far at their instance, and in this summary way, to enter upon the consideration of the question whether the lamp now submitted infringes the patent in suit. This lamp was not before the courts of the Second Circuit, and the question of infringement involved in this rule is entirely new. There is a marked difference of structure between this stopper lamp and the lamps enjoined, but enough appears to satisfy us that the question of infringement cannot be determined safely upon a mere inspection of the lamp. No investigation would be complete without the aid of expert testimony and evidence touching the art of electric lighting in its earlier stages. But *ex parte* affidavits upon these subjects (and this rule contemplates nothing more) would be most unsatisfactory. Moreover, should the rule go to hearing on the merits the action of the Court thereon would be inconclusive.

"The rule to show cause, granted February 1, 1893, will, therefore, be discharged, but without prejudice to the defendants' rights to set up in their answer the matters upon which said rule was founded, and it is so ordered."

This permits the Westinghouse Company to continue the manufacture of the "stopper" lamp until final disposition of the case. The petition of the Westinghouse Company to restrain the Edison Company from suing Westinghouse customers is pending.

British Board of Trade returns for the year 1892 show a material falling off in the exports of tin andterne plates from Great Britain during the 12 months ending December 31, 1892. The reduction in the case of shipments to the United States amounts to 46,664 tons, as compared with the figures for the previous year. These

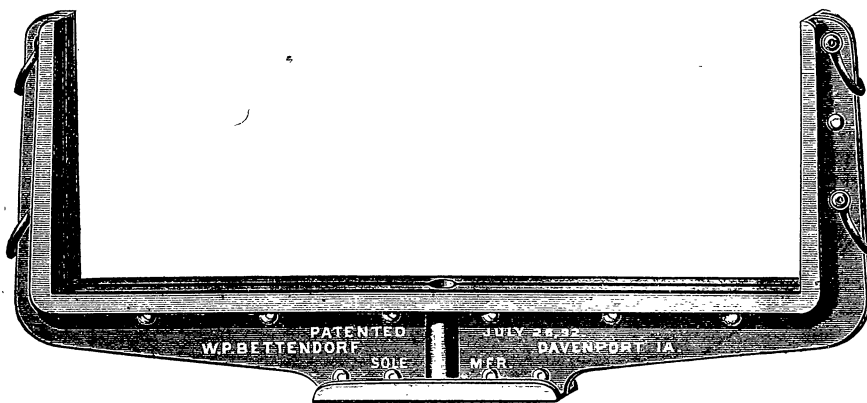


Fig. 3.—Combined Bolster and Stakes.

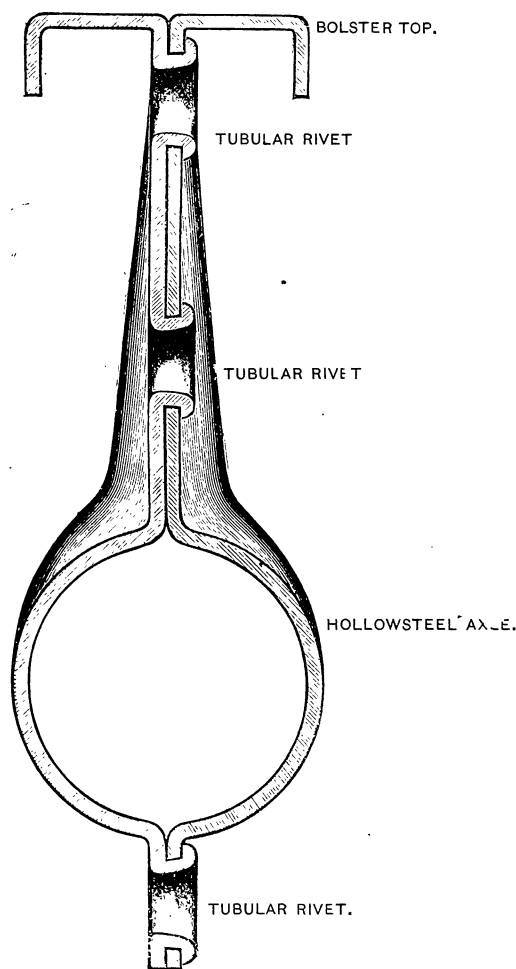


Fig. 4.—Cross Section taken Vertically from Top of Bolster through Axle.

THE BETTENDORF HOLLOWSTEEL WAGON AXLE.

tion with the wooden axle is further assisted by the growing scarcity of hard wood suitable for axles and the rapid advance in price in recent years. In fact the substitution of steel for wood in the manufacture of axles would seem to be almost a necessity in order to insure cheap wagons in the future.

At present the manufacture of only 3½ x 10-inch axles with narrow track will be undertaken. This covers the standard sizes of wagons in common use. Other

the combined exchanges in that section, the Southern Railway and Steamship Association has decided that ports on the Atlantic coast shall be put on an equal footing with ports on the gulf. These ports are now given the same rate per ton per mile as is given New Orleans and the Northern ports, and, while the rail distance to Savannah is greater from Western points than it is to New Orleans, there is a saving of 1,100 miles by sea, besides a quicker transportation.

are given in the return as follows: 1891, 325,143 tons, valued at \$26,000,000; 1892, 278,479 tons, valued at \$18,500,000. These totals show a more considerable percentage of decline in the value of exports of tin plates than in their volume, which is, nevertheless, very great, comparing unfavorably with any year since 1887. It should be stated that the decrease in British tin-plate shipments for 1892 has not been peculiar to this country, but has been almost uniform to all foreign countries. The total volume of exports of this material from Great Britain, we learn, decreased last year 11.7 per cent. from those of 1891, and their value fell off 25.5 per cent. for the same period.

Americanizing British Tonnage.

The ceremony of raising the American flag on the Inman steamship "New York" was performed according to appointment, regardless of unpropitious weather. President Harrison, who acted the principal part, said he regarded the event as chiefly significant, in "the fact that this ship is the type and precursor of many others that are to float this flag." The Inman Line service on the North Atlantic Ocean originated in 1850. Richardson Brothers & Co. of Liverpool, England, and Richardson, Watson & Co. of Philadelphia, had been owners of a line of sailing packets trading between Philadelphia and Liverpool. In 1850 they started a line of first-class steamships between these cities, subsequently changing the American port of departure to New York. The late William Inman was a partner in the Liverpool house and managed the shipping department. He was managing director of the company from 1854 to the time of his death, in 1881. In 1886 the old company dissolved and a new one was formed, called the Inman & International Steamship Company, Limited. The steamships "City of New York" and "City of Paris" were constructed by James and George Thompson of Clydebank, near Glasgow. The two ships cost \$3,000,000. Each has a tonnage of 10,500, length, 560 feet; beam, 63½ feet; depth from the top of the upper cabins to the bottom of the keel, 59 feet. Two distinct sets of triple-expansion engines furnish the power. The "New York" was launched in August, 1888, and the "City of Paris" in 1889. It remains to be seen whether these steamers can be navigated as cheaply with American as with English labor.

Colorado Steel Rail Business.

A director of the Colorado Fuel & Iron Company informs a reporter of *The Iron Age* that the output now being made by the steel rail plant of his company is meeting the most sanguine expectations. The plant is turning out 400 tons of rails per day, working two turns. It is now able to produce pig iron at \$13 per ton, and markets its rails at prices ranging from \$31 to \$34 per ton. Owing to its territorial position it has been enabled to enter the market as a competitor of Eastern mills, and has captured about all the current steel rail business west of the Missouri River. Its contracts thus far for this year's deliveries are 60,000 tons, which were placed by the Denver & Rio Grande, the Union Pacific, and Atchison, Topeka & Santa Fé. It is figured that this section of the country consumes about 150,000 tons of steel rails per year, and that it will be able to command this amount of business, and the management anticipates enough additional orders to insure full and continuous operations during the balance of 1893.

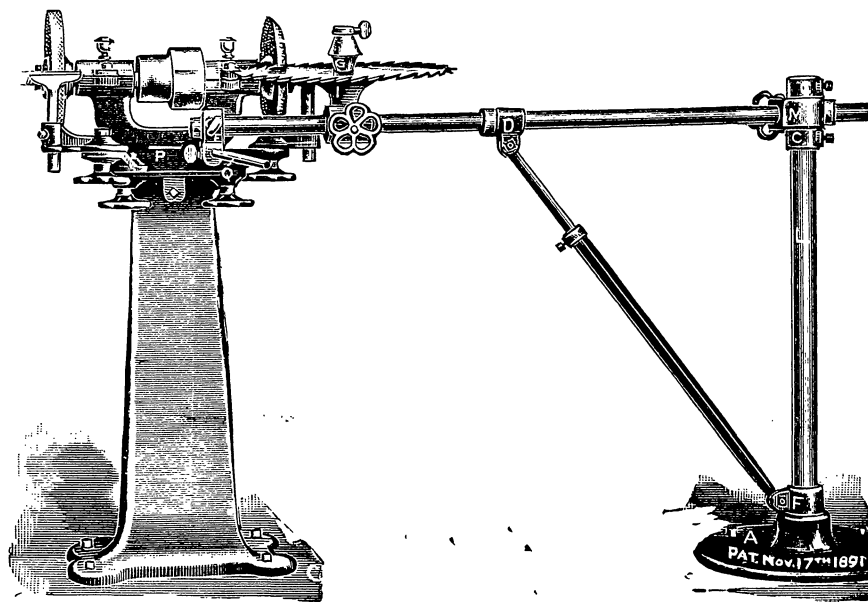
The mill had never been running full capacity, and consequently its operations

were conducted at an expense out of proportion to its profits. By running full force and the introduction of new appliances and methods, which are continually being made, the mill is placed on a competitive basis with Eastern institutions. No overtures have been made to the company by the Eastern Rail Association. We understand that it will be the policy of the company not to co-operate in any way, but to get as much for its product as is possible.

The Common-Sense Saw Gummer.

In the saw gummer here illustrated, which is made by the Toledo Saw Company of Toledo, Ohio, the upright shaft of the crane is made of 2-inch iron and the horizontal shaft of 1½-inch. The collar holding the saw slides on the horizontal shaft and is set with a hand screw at any position for the desired hook in the saw teeth, and makes every tooth the same pitch.

The small casting on the end of the horizontal shaft is adjustable, and the rod



THE COMMON-SENSE SAW GUMMER.

running through it can be set for jointing and for making every tooth the same depth.

When the crane is properly adjusted it swings easily and can be operated by the average mechanic; it will take on a saw from 6 inches to 6 feet in diameter and joint and gum it without removing. The emery grinder is made with a 1-inch shaft, babbitt boxes and adjustable rests.

Mechanic Arts Building at Bellefonte, Pa.

The Mechanic Arts building at Bellefonte, Pa., was dedicated on the 22d ult., and the educational equipment of the college now ranks with that of the foremost universities in the country.

The new building is three stories high, has a frontage of 265 feet and a depth of 200. It was erected at a cost of about \$100,000. In the basement are the mechanical and hydraulic laboratories, the heating apparatus, the dynamo room and the pumping station. On the first floor will be the offices of the professors in civil, mechanical and mining engineering, lecture and model rooms, and the machine and forging departments. Lathes and planers will be erected in several rooms of the machinery department, while the

forging shops have space for 21 fires and anvils. Much attention has been paid to the two latter branches of the engineering course, and when fully equipped they will be in advance of those belonging to any technical college in the United States. The wing contains the wood turning and carpentry departments, and a foundry is to be erected in a short time.

A Cycle Board of Trade.

Bicycle prices in Chicago are to be regulated hereafter by the Cycle Board of Trade, which was incorporated last week by R. D. Garden, F. S. Douglas and Charles F. Stokes, all of whom are prominent in that branch of trade.

"The plan of the Cycle Board of Trade is to bring dealers together, arrange questions of discounts and time payments, to settle on prices at which old wheels are to be taken in exchange for new ones, and to put a stop to ruinous competition," said Charles F. Stokes. "It is not the desire to put up prices, but to prevent cutting from the prices at which the

wheels are listed. There has been a need for such an institution for a long time. Ruinous cuts have been made in the price of wheels, long time has been given in which to pay for wheels, and an intending purchaser who had an old wheel to trade for a new one would be offered \$50 by one dealer, \$75 by another, and \$90 by another in trade. The result has been the demoralization of the business. One of the reforms planned is the cutting to six months of all time payments. Ten months have frequently been given in selling a wheel on time payments. All the large manufacturers' agents have expressed a desire to join the Cycle Board of Trade, with one exception. There is no idea of raising prices on bicycles. In fact, it is not the intention to take the matter of prices into consideration. What we will try to do is to have manufacturers set prices for their wheels and then stick to them. This will apply only to first-class wheels, those ranging in price from \$135 to \$150."

The new Secretary of the Navy is Hilary A. Herbert of Alabama, who was Chairman of the Naval Committee during Mr. Cleveland's former administration and rendered efficient service in initiating the movement for the creation of a new navy, since prosecuted with so much success.

American Turbine Water Wheels.—V.

BY SAMUEL WEBBER, CHARLESTOWN, N. H.
(Conclusion.)

The next and final great change to be noted is the introduction of turbines on horizontal shafts.
The first illustration of this mode of application I am aware of is the tracing, Fig. 20, from "Glyn on Water Power," 1853, showing a pair of Archimedian scroll wheels devised by Professor Redtenbacher of Berlin about 1851. In 1861, or about that time, the late John C. Hoadley put in a Parker (wooden) scroll wheel, with draft tube, in this manner, to drive a calico printing machine, for the

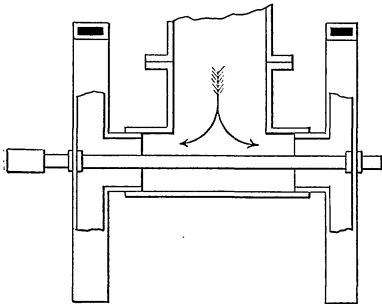


Fig. 20.—Horizontal Shaft Turbines.

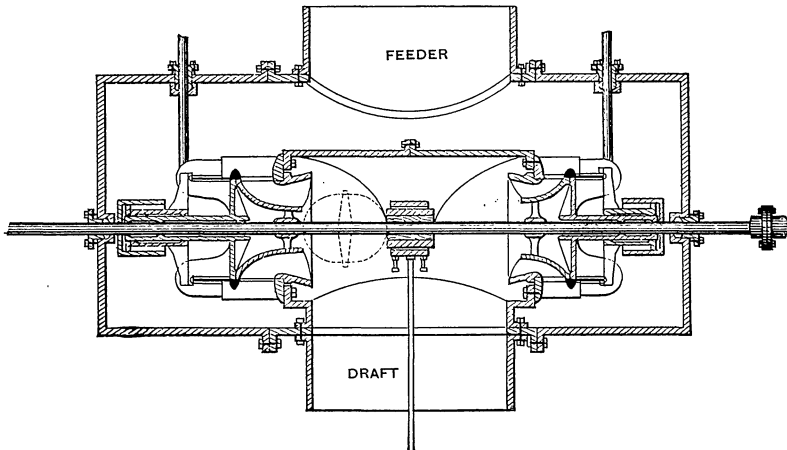


Fig. 21.—Method of Utilizing Old Wheelpits.

AMERICAN TURBINE WATER WHEELS.

Manchester Print Works in New Hampshire, of which the writer was then manager, and in the course of the year or two following the writer put in seven small "inward-flow" turbines of cast iron in the same works, discharging the water from them through "quarter-turns" into draft tubes. These were all small wheels, of 10 or 12 horse-power each, and answered the desired purpose perfectly.
The writer saw nothing patentable about them, and his attention was soon engaged with other matters, but in 1876 A. M. Swain placed a pair of his wheels on one shaft, under 65 feet head, in the mills of the Lake George Mfg. Company at Ticonderoga, N. Y. These wheels were 24 inches diameter and made 444 revolutions per minute, giving 400 horse-power. This mode of setting was soon taken up by other turbine builders, and in 1879 the writer saw a pair of wheels made by Gates Curtis of Ogdensburg, N. Y., at the Holyoke flume, and assisted in testing them. In 1880 the writer planned a plant of three Risdon wheels on one line for the

P. C. Cheney Paper Company of Manchester, N. H., under 39 feet fall, 13 of which was above the wheel and 26 feet in the draft tubes. Two of these wheels discharged into the same draft tube; the other one had a separate draft, but stood in the same line, and could be coupled on so as to run all three together if it was desirable.
Since then nearly all the leading makers have adopted this plan wherever the fall is high enough to keep the belt pulleys above tail water, and as it saves the cost, noise and care of bevel gears, it is coming into general use. Parker's "draft tube" made horizontal shaft turbines practicable, and horizontal shafts make high heads available, as they do away entirely with long vertical shafts, the weight and friction of which on the steps is expensive and undesirable.
In cases where the whole plant is entirely new it is usually the custom to bring the water in to the case at the center, discharging it through "quarter turns" at each end; but, in order to utilize old wheelpits, a form substantially like Fig. 21 is adopted.
I have omitted one other recent turbine of value, "The Humphrey," built by the Humphrey Machine Company of Keene, N. H., which is also set on horizontal shaft when practicable. While not giving the power, as compared with diameter, of the two last wheels, it gives a high effect for the water consumed and ranks for capacity with the Swain and Hunt. Mr. Humphrey claims the curves of his gates

and buckets to be "paraboloid." I have called those of the earlier turbines "cycloidal," and I have great doubts if the difference is appreciable in practical effect.
Mr. Francis, in his Lowell hydraulic experiments, gave carefully-prepared rules for proportioning the Fourneyron Turbine, introduced by M. Boyden, but the modern turbine renders them useless. The American Turbine, as it is constructed to-day, has fewer and wider buckets, for the same diameter, and the length is proportionately greater.
The water striking the bucket horizontally and tangentially to the surface of the wheel is deflected by the long double curve of the bucket, meeting fresh elements of resistance, until when it has imparted its own velocity to the wheel it falls away perpendicularly from its lower edge into the back water in the pit; and, to the writer, its effect seems to be solely due to its weight, acting in the direction at first of a thrust and finally of a wedge, until its whole momentum is imparted to the wheel. Mr. Francis conclusively

shows that the best result is obtained when the velocity of the wheel is that due to the contracted rein acting on the head, and it has also been proved that the best result is obtained when the wheel is submerged, so as not to admit the entrance of air. The same principle affects the use of draft tubes, which are now generally employed, so as in all cases to deliver the discharge under water.
The larger buckets and opener guides of the American wheels obviate the troubles from obstructions by ice, leaves and fish, which attended the Fourneyron wheels originally designed for small volumes of clear water under high heads, and the tests of efficiency show them to be fully equal to their imported predecessors, if not superior.
When 85 per cent., net effect, can be obtained from the wheel shaft, and a proper allowance above this made for the forces required to overcome the *vis inertia* of the wheel, and its friction on steps and bearings, there is very little water left to be accounted for as "slip" or lop. The writer can easily name a dozen wheels, all of the American form, but two which, by his own tests, have given from 80 to 84 per cent. net effect at full gate, and from 60 to 70 per cent. at half water, one or two of them reaching to over 87 per cent. full, and 75 per cent. half, naming them alphabetically as follows, and also showing the great variations in discharge and capacity of some of them of nearly equal diameter, and the increase they all show over the Boyden, with which the column begins:

	Inch diam.	Cu. ft. per sec. 26 ft. head.	Horse-power.
Boyden Fourneyron.....	36	22.95	55
New American (Swain bucket) ..	40	40.5	103.6
Burnham.....	40	40.5	96
Collins (Jouval) ..	36	107.6	253.5
Geyelin (Jouval).....	36	48.8	121
Hercules.....	35	40.45	96
Humphrey.....	35	60	148
Hunt (Swain bucket).....	40	59.6	144
Leffel (standard).....	36	35.45	89
Leffel (special).....	36	48.27	121
National.....	36	58.3	140
Risdon (standard).....	36	40.7	95.8
Risdon (L. C.).....	35	108.8	266
Success.....			
Swain.....			
Tyler.....			
Victor.....			

I have been thus full in this account of the development of the turbines, because the introduction of electro transmission is likely to soon render many unused and somewhat inaccessible water powers of great value. Although many, or almost all, of the largest falls in the Northern States, where there was level land around them to build a town, have been taken up, there are hundreds more in steep and rocky gorges where no building sites are available, but where a dam, a turbine and a dynamo could be cheaply and easily located and the power transmitted over the wires to the nearest town or railway for practical use.
It has been the fashion lately among young engineers to decry water power and exalt steam, but it has usually been due to their entire ignorance of the cost and value of the former. Brought up in most cases in large cities, where water power was unknown and steam the only available force, with cheap freights and consequently low-priced coal, they have based their calculations on the cost of steam, on large compound engines of 1000 or more horse-power and 120 pounds pressure of steam in their boilers, and by careful 10-hour trials succeeded in figuring down steam to a cost of about \$20 per horse-power, ignoring the well-known fact that its average cost in practical use, except near the coal mines, is from \$40 to \$50.
Then as the large water-power companies, who have often spent large extra sums to secure every drop of water that runs, except at the high spring floods,

charge a rental of \$20 per horse-power, they say steam is as cheap as water.

This is not true, for in many instances dams, canals and modern turbines can be all completed for a cost of \$100 per horse-power; and the interest on that, and the cost of attendance and oil, will bring water power up to but about \$10 or \$12 per annum; and with a man competent to attend the dynamo in attendance, it can probably be safely estimated at not over \$15 per horse-power.

I therefore look in the future to the development of many now unused water powers, and their transmission by electricity to accessible situations for their use, as is now being done in the case of Sewall's Falls on the Merrimac, to be used at Concord, N. H., and in the great projector development at Niagara.

The Maris Hand Traveling Crane.

This crane was originally designed to meet the requirements of general machine, shop use, and especially in those places where the infrequency of use of such a machine prohibits the employment of power cranes.

The bridge of the crane is constructed of two steel I-beams of proper section to

Much encouragement has been given to the line, and it is likely that the service now inaugurated will be maintained permanently. Freight rates are about those of ordinary sailing vessels.

High Velocity and Projectiles.

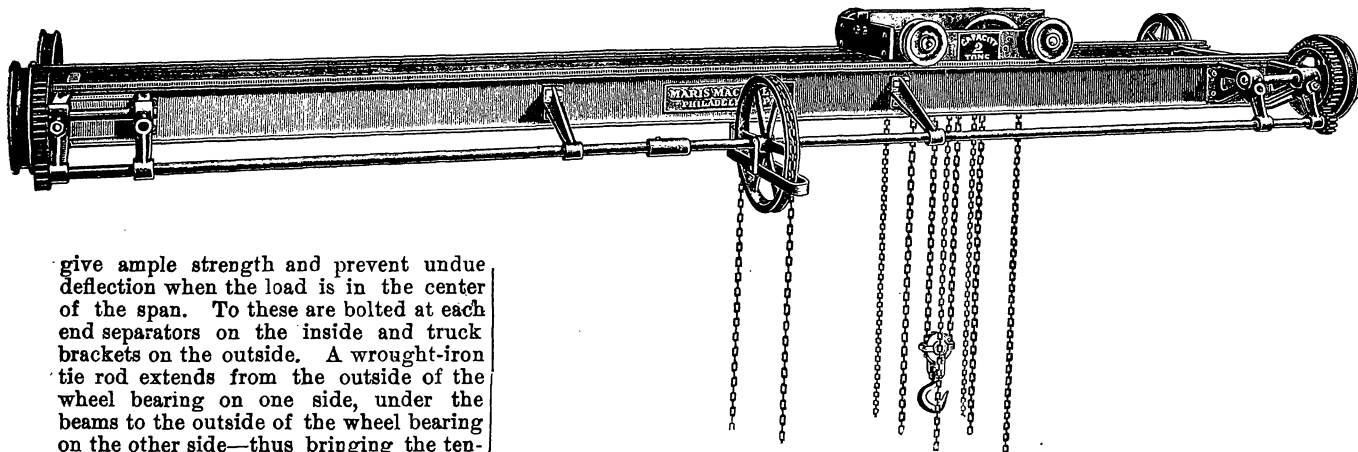
Prof. S. Tolver Preston, an English scientist of high reputation and a writer of numerous essays upon electrical and physical subjects, has now come to the front with a novel and original scheme for attaining unprecedented velocities in projectiles. There certainly appears to be nothing in underlying principles that is opposed to the method. The scheme, however, reminds one very much of the famous French recipe for cooking an olive, in which the olive was stuffed into the body of a canary bird, the canary with its precious olive then put into a pigeon, the pigeon then placed in the interior of a larger fowl and so on till the possibilities of this kind of enveloping were exhausted, then the whole to be roasted till the flavor of the different savory wrappings penetrate to the very core of the olive. One might say of Professor Preston's scheme as of this kind of cooking, the result sought could thus possibly be attained, but the recipe must in its nature be rather expensive.

explosive having a force capable of independently imparting a velocity of, say, 1800 feet per second to the ball; the latter will then have a total velocity of 6000 feet per second. This velocity is twice that ever attained by a projectile discharged from a gun.

A velocity of 3000 feet per second was attained with an aluminum projectile in the experiments of Prof. Vernon Boys. By the use of this light metal a much greater ratio of pressure to the inertia of the mass can be exerted upon the projectile than is possible with metals of greater specific gravity.

Professor Preston thinks, as there are no theoretical limits to the generation of velocities in projectiles by the method proposed by him, that a practical limit of 9000 feet per second is perhaps not too much to anticipate. "I wish he may get it" will probably be the thought of most men who are familiar with the practical difficulties of generating high initial velocities in projectiles.

Should such velocities in projectiles as this ever become practical, that is to say, be attained without sacrifice of precision in firing, armor plates would cease to be of much use; but the consummation, though in view of all that has been accomplished it may not be impossible, is doubtless so



give ample strength and prevent undue deflection when the load is in the center of the span. To these are bolted at each end separators on the inside and truck brackets on the outside. A wrought-iron tie rod extends from the outside of the wheel bearing on one side, under the beams to the outside of the wheel bearing on the other side—thus bringing the tensile strain on the wrought iron and the compression strain on the cast iron.

The truck wheels have roller bearings working in steel bushings and are driven at equal rates of speed on both ends of the crane, by a shaft running across the span of the bridge, carrying on each end a pinion which gears into the wheels, thus keeping the crane straight on the runways. The hand wheel which operates the shaft is placed near the center of the shaft, so as to distribute the torsion equally, but as a matter of fact it can be placed at any point desired without materially affecting the operation of the crane.

The trolley runs on tracks riveted on the upper flange of the beams and has roller-bearing wheels driven by a hand wheel mounted in the trolley itself.

The hoist is mounted in the trolley and does not hang underneath it unless specially desired. This arrangement gives the greatest possible lift and, together with the small amount of head room taken up by the trolley, makes the crane very economical of space. These cranes are made by Maris & Beekley of 2343 Cal lowhill street, Philadelphia, in all sizes from 1000 pounds up.

Following close upon the heels of the news of the troubles of the Brazil Mail Steamship Company comes the announcement that the shipping firm of Norton & Son of Wall street have resolved to re-establish their line of steamships to the River Platte ports, in South America.

THE MARIS HAND TRAVELING CRANE.

Briefly stated, it is proposed to inclose a projectile within a projectile, and this charged projectile within still another projectile, after the manner of the olive recipe, and to fire the entire nest from a gun, with automatic means for firing the projectiles one after another, so that the last to be discharged shall possess the sum of the velocities each respectively acquires during the series of discharges.

Suppose a projectile, A, in the form of a rifle barrel to be loaded with a powder charge, and a smaller projectile, B, of similar rifle barrel form to be placed in A, and in its turn loaded with powder and ball. This nest of projectiles is then to be inserted into the barrel of a larger gun. Suppose the initial velocity of the entire nest when fired from the large gun to be 2200 feet per second. At this instant the A projectile is automatically discharged. As its contained projectile B has already the velocity of 2200 feet per second, whatever velocity the firing of its powder charge can impart to B will be added to the previously acquired velocity, and if we suppose the second discharge to be able of itself to impart a velocity to B of 2000 feet per second, B will now have a velocity of 4200 feet per second. Also the ball inclosed in B has now a velocity of 4200 feet. Now, let B in its turn be automatically discharged, its contained

remote a contingency that it will not at present revolutionize modern warfare.

The policy to be pursued by the newly-appointed Secretary of the Navy, Mr. Herbert of Alabama, is marked out in his report as chairman of the Committee on Naval Affairs made to the House on the 13th ult., to accompany the Naval Appropriation bill. That policy is to construct no more cruisers at present, but to provide for the building of seven or eight more battle ships as fast as the steel works are able to furnish the armor for them. With these battle ships and a reasonable number of torpedo boats our navy would rank fifth among the navies of the world. Mr. Herbert calls attention in his report to the fact that in 1860 the expenditure for the navy, in the days of wooden ships, cast metal guns and cast-iron projectiles, was 40 cents *per capita* per annum, while during the past ten years of building a modern navy of steel ships armed with steel guns the expenditure *per capita* has been less than 32 cents.

It is now definitely known that a new bridge will be constructed across the gorge at Niagara Falls either by the Railway Suspension Bridge Company or the Grand Trunk Railway Company.

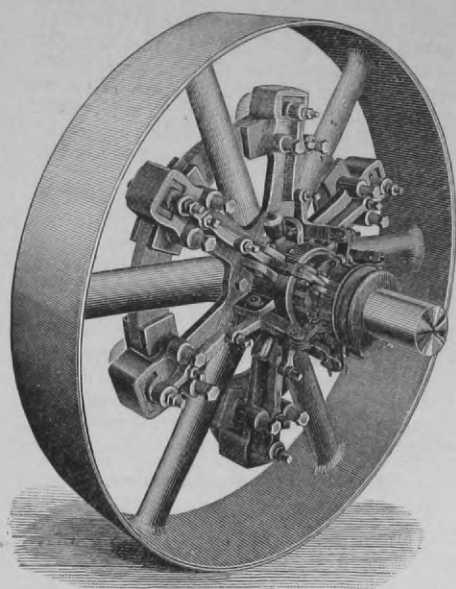


Fig. 1.

Clutch Pulley Used as Driver from Line Shaft.

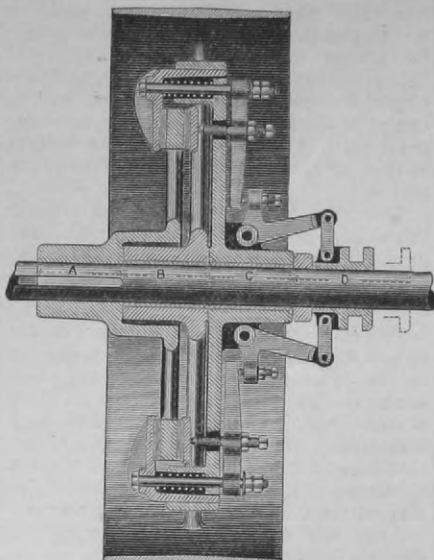


Fig. 2.—Section of Fig. 1.

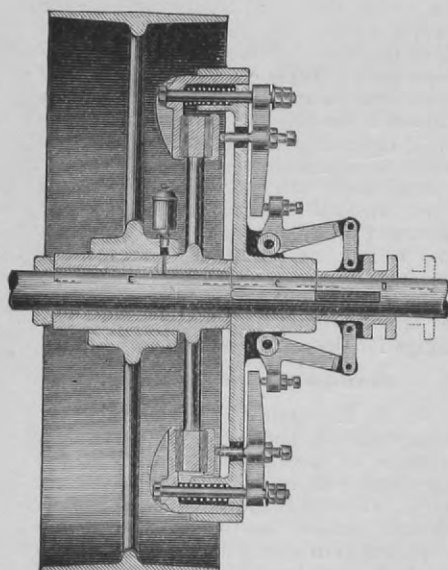


Fig. 3.

Clutch Pulley when Used as a Receiver.

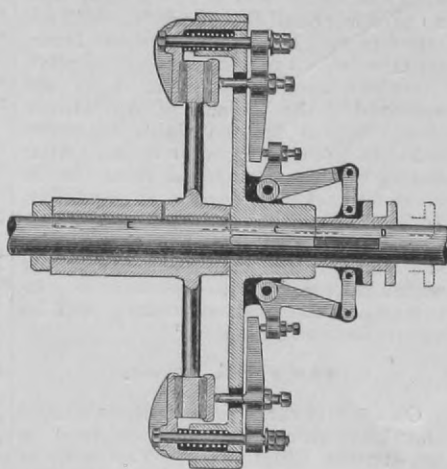


Fig. 4.—Section of Fig. 3.

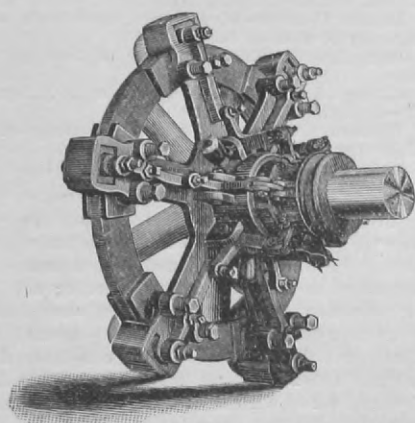


Fig. 5.

Clutch when Used as Cut-Off Coupling.

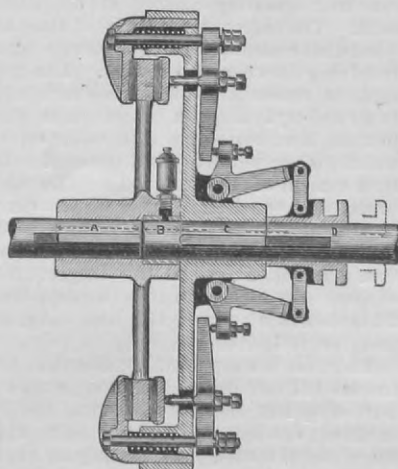


Fig. 6.—Section of Fig. 5.

The Keystone Friction Clutch.

A new friction device, of which engravings are here presented, is being introduced by the Keystone Clutch and Machine Works of 1708 Germantown avenue, Philadelphia. The first two cuts show this clutch in connection with a pulley when the pulley is used as a driver from a line shaft, as, for instance, is the case when several dynamo machines are driven from a line shaft. In this case, as can be seen by the sectional cut, a friction wheel or disk is keyed on the shaft and revolves between two friction shoes, which, by a combination of levers, clamp this wheel between each other. The shoes are attached to a sort of spider, which is bolted against one side of the pulley arms, forming half of the hub of the pulley and allowing the shoes to reach through the space between the pulley arms and take hold of the friction wheel on the other side. Hereby an advantage is gained, as the whole clamping mechanism stands still with the pulley when out of gear. This avoids all trouble arising from nuts or screws getting loose when the parts are in motion but are not under tension, and also prevents the parts assuming different positions in relation to the axis around which they revolve, and thereby causing the whole mechanism to be at the time entirely out of balance. At the same time it is apparent that should any one friction begin to slip while the shaft is in motion, it might be set out and adjusted without interfering with any of the others on the same shaft. The friction shoes have friction surfaces made of hard wood, which can be very easily replaced. The shoes moving parallel to the shaft, an uneven wear of them will not influence their relative position to the shaft and cause the mechanism to become out of balance after being in use for some time.

Figs. 3 and 4 show a friction pulley when used as a receiver. In this case the friction wheel is made with an extra long hub on one side, upon which the pulley is fastened, whereas the spider that carries the clamping mechanism is keyed fast upon the shaft. The works also furnish the friction device in this form without the pulley, as the next cuts illustrate. It may be used for gear wheels, sheaves or chain wheels, as the case may be. Last, the device is used as a cut-off coupling.

The collapse of the scheme for controlling the New England coal trade, conceived by Mr. McLeod, proves to be one of the most colossal failures that lately have overtaken business enterprise. It only has a parallel in the Argentine collapse, the Baring's failure, and the defeat of De Lesseps at the Isthmus of Panama. The Boston & Maine and the Reading systems, which he hoped to join together, were to be linked by two lines—the Poughkeepsie Bridge route over the old Connecticut Western (now Central and New England) to Hartford and the New England line. These two lines, while pretty far apart, in a certain sense parallel each other locally—both meeting at Hartford—and in a larger sense compete with each other on through traffic, especially as to freight. The idea of President McLeod seems to have been substantially as follows: First, to make the Poughkeepsie Bridge route the main line for through freight traffic, and, secondly, to make the New England self-supporting—in the railroad term, "wash itself." Altogether, had Mr. McLeod succeeded, he would have combined under one management more than 2000 miles of New England railroad track; and the primary object was to secure a market for the enormous coal export which the control of anthracite fields in Pennsylvania made possible.

THE KEYSTONE FRICTION CLUTCH.

WORLD'S FAIR NOTES.

Labor Troubles.

The first labor organization to attempt a hold-up at the World's Fair, with the necessity of being ready by May 1 as the club, was the Electrical Wiremen's Union. The attempt was a flat failure. Director of Works Burnham anticipated the announced strike last week by having all the electrical wiremen in the employ of the exposition to assemble at the Transportation Building. There he made a short address. He told the men he would not be forced to pay equal wages to all; that some earned more than others and were entitled to more pay. When Mr. Burnham had concluded he asked all who wanted to leave to go to one side of the aisle and those who wished to remain to go to the other. The men separated, sixty-nine desiring to go and fifty-five to remain. The sixty-nine were paid off and at once left the grounds. At the same time 140 employees of the insulating company, which has the subcontract for stringing the wires for the Westinghouse Company, quit work.

The demand of the union upon both the insulating company and the exposition was the same, being for uniform wages of 37½ cents an hour, time and a half for over time, and double time for Sunday work.

The pay roll of the Exposition shows that of 69 strikers 43 received 31½ cents an hour, 11 30 cents, 12 35 cents, 1 50 cents, and 2 25 cents. The force had been working nine hours, with time and a half for the last hour, making the daily wages \$2.99 for 43 of them.

The strike contagion did not manifest itself anywhere else on the fair grounds, and officials are hopeful of quarantining against it. The bad weather has delayed in some degree a good deal of work on the grounds, and this loss must be made up in short order as soon as the snow and frost disappear. The most important point just now is Machinery Hall, where a force of 325 men is engaged in preparing the foundations for the heavy machinery. Any delay in this work would be critical, as all the time remaining is needed to get the machinery into place.

The work of constructing the exhibit pavilions in the Manufactures Building is being rushed forward as though May 1 were two weeks instead of two months in the future. In fact this particular branch of construction work is being hurried along in every department, but so great is the main building that particular attention is paid to that.

Passes and Admission Tickets.

Sixty thousand passes will be issued by the exposition management to the fair next summer. Every person of prominence who might be expected to have a free admission will secure it. The bulk of the passes will, however, go to the 45,000 exhibitors and their employees.

Each one of these passes will bear the picture of its holder. Within a few weeks a circular will be issued to those entitled to these free admissions and requests for their photographs be made. These will be taken to Jackson Park, rephotographed to vignette size, and then placed on the cover of the pass-book. These pass-books will contain one coupon for every day of the exposition and one must be torn off for every admission. In case the holder leaves the grounds within the day he will be given a return check.

Monthly passes will be issued to employees of exhibitors. They will be renewed every 30 days, in case the bearer retains his connection with the exposition.

Aside from the passes there will be two sets of admission tickets. The first will be handsomely engraved and suitable for

souvenirs. They will be issued in four series, one bearing the head of Columbus, the second that of an American Indian, the third that of Washington, and the fourth the picture of Lincoln. These will be placed on sale by April 30. It is thought that they will be largely purchased and retained as souvenirs, and to complete the series the investor must expend \$2. These tickets will not be sold at the gates, but at designated downtown places.

The gate tickets will be less artistic affairs and probably be good for one day only. The others are to be good for any day.

The Steam Boiler Fight.

The Stirling Boiler Company have reason to feel elated over the latest development in the famous boiler controversy. Last week Judge Grosscup of the United States Court, to which the case had been transferred, refused to grant the injunction asked for by the Babcock & Wilcox Company against the World's Columbian Exposition Company and others, restraining the fair officials from allowing the Stirling Boiler Company to place an exhibit of boilers alongside the Babcock & Wilcox Company exhibit in Machinery Hall. The reason given was that the complainants were to have the remaining space if the fair needed additional boilers. An agreement with Mr. Sargent, representing the Chief of Construction, was the basis of the complaint. In his decision, Judge Grosscup held that there had been no agreement and that the court could not interfere with the discretion of the Director-General. Again, the supposed privilege had not been submitted to and approved by the Council of Administration. Sargent had no right, the court held, to grant such a privilege. After stating that the Babcock & Wilcox boiler plant was acknowledged to be an exhibit, Judge Grosscup says:

"Nothing is clearer than that the installation of the exhibits is exclusively within the control of the commission. In this respect the local corporation and its agents have no authority."

The Ferris Wheel.

On the Midway Plaisance there will be an exhibit which is intended to rival in novelty the Eiffel Tower. This will be the Ferris wheel. Its diameter will be 250 feet. The wheel is intended to convey passengers around a circle in cars, from which visitors will have a full view of the exposition grounds and buildings. The wheel will be 264 feet in height. Around it, suspended between the two crowns by steel trunnion pins, will be 36 passenger cars with a seating capacity of 60 persons each. The entire structure is of steel and somewhat resembles a huge bicycle wheel revolving between two towers. The principle of construction is somewhat similar to an old style English breast water wheel in that it consists of a stiff outer crown, which is suspended from the center axle by a system of tension rods. The wheel practically consists of two wheels placed on the same axle, spaced a distance of 28½ feet apart and held together by struts and ties. The great axle is the largest piece of steel ever forged in this country, being 33 inches in diameter, 45½ feet long, and weighing 56 tons.

The axle is supported by means of steel towers 137 feet high. These are each supported by four legs, two vertical and two inclined, connected at the base by eight huge portal struts, thus forming an almost solid arch of steel. The foundations of masonry beneath the tower taper from an immense base to a height of 18 feet and under this are piles and concrete. Passengers, while indulging in their novel trip, will be just as safe as while riding out to the grounds on a railroad train.

Arranged in groups on the rods around the crown of the wheel are 3,000 incandescent lights of various colors. These will be alternately extinguished and relighted at night as the wheel revolves. The engines which are to revolve this structure are in themselves an object of interest. They consist of two link-motion reversible engines of 30 inch bore, 4 foot stroke and 2000 horsepower.

The Ferris wheel is to be located in the middle driveway of the Midway Plaisance, about 100 feet from one of the entrance gates. The driveway divides at the wheel, and passing on both sides converges after the wheel has been passed. It is the personal invention of G. W. G. Ferris, a bridge engineer of Pittsburgh and head of the firm of G. W. G. Ferris & Co. Robert W. Hunt of the Robert W. Hunt & Co. Inspection Bureau is president of the Ferris Wheel Company.

For Bicycle Enthusiasts.

Nearly 60,000 enthusiastic bicyclists make their homes in Chicago and vicinity, and it is in recognition of these and the wheelmen of the entire country that the exposition authorities will establish two bicycle courts at Jackson Park. In making this arrangement, too, it is estimated that the passenger transportation problem will be made easier of solving. Days of special importance will see 10,000 wheelmen at the park, who would, only for the bicycle courts, be compelled to depend upon the already overcrowded cars and steamboats. These courts will be of sufficient size to accommodate 8000 wheels. They will be each 200 x 40 feet in dimensions, covered with glass, and built on rather unpretentious lines.

Attendants will be maintained in each court, who will receive the wheels, check them and then place them in racks, where they will be kept until the return of the owners.

No person without a bicycle will be permitted to enter the wheel courts. The charge for the service will be very light.

Transportation Facilities.

W. H. Holcomb, General Manager of transportation, has just completed a final estimate of the carrying capacity of the lines that will control the Jackson Park traffic. He has found that not more than 100,000 persons can be handled in one hour, but even that will make any serious blockade or inconvenience impossible. This estimate may be increased a little during good weather, when an extra force of excursion boats may be brought into service on the lake. The following is the estimate sent by Mr. Holcomb to the Council of Administration:

World's Fair Steamship Company—Three vessels, with a carrying capacity of 5000 each.
Illinois Central—Five tracks, each with a capacity of 6000 per hour.

Baltimore & Ohio—Capacity of 5000 per hour.

Chicago & South Side Rapid Transit (Alley L)—Capacity of 20,000 per hour.

Wabash Avenue Cable Line—Capacity of 15,000 per hour.

State Street Cable Line—Capacity of 15,000 per hour.

This gives a total of 100,000 per hour carrying capacity. Mr. Holcomb believes this to be sufficient to meet all demands unless some accident should occur; and, to prevent trouble, he is now giving his time to a plan for perfecting all terminal facilities. There are now being constructed within Jackson Park thirty-five terminal tracks, all of which will be constantly in use after May 1. The trains made up at the park will be the heaviest ever drawn, averaging fourteen cars each.

Old Locomotives Received.

There rolled into Jackson Park last week a quaint little locomotive 57 years old and with a history possessed by no

other engine in the country. This little old locomotive was the first one used on a railroad west of Chicago and was the first one to come into Chicago. Forty-four years ago it was shipped there by lake. At that time there was no railroad in Chicago running East. The Lake Shore, which was the first to reach the city, had not at that time completed its line. The locomotive was purchased for the Galena & Chicago Union Railway, which was constructing a line to Galena, and its first service was to haul rails and ties for the extension of the new line. It weighs, all told, but 8072 pounds and has only six wheels. There are but two drivers and these are connected directly with the piston rod. Its fittings are extremely simple. The locomotive is owned by the Chicago & Northwestern Railroad. It was built in Philadelphia by M. W. Baldwin in 1836. It was originally constructed for the Utica & Schenectady Railroad and subsequently sold to the Galena. It has no brakes of any sort and its whistle is of a diminutive character. It is the first locomotive to be installed in the Transportation Building. Two old locomotives have also been received from France. The names of the locomotives are the Samson, built in 1837, and the Albion, built in 1838. A passenger coach of great antiquity accompanied them. It is upholstered in white satin and is in a splendid state of preservation. The engines are queer pieces of mechanism, having perpendicular cylinders and connecting rods with the old hook action. They were built in England.

Wisconsin's Display of Minerals.

Among the State exhibits in the Mines and Mining Building Wisconsin promises to make a showing that will stand in the very front rank and attract universal admiration. Special effort is being put forth by the Badger Commonwealth in arranging its display of mineral and geological products, many of the most valuable specimens of which will enter into the construction of a magnificent pagoda 25 feet high, and occupying a floor space on one of the best blocks in the Mines Building 49 feet long by 45 feet wide.

This pagoda will consist of four monoliths resting on elaborately carved bases furnished by the Prentice Brown Stone Company. There will be two entrances of terra cotta surmounted by the coat of arms of the State. The railing extending around the four sides will be made of green jasper and fancy granites with wrought brass panels of clever design. The plans show that the pavilion in the center rests on four blocks of different colored granite, and the capitals of the columns which hold them will be liberally studded with amethysts and other brilliant stones. The fountains in the center of the pagoda will also be of amethyst, the whole scheme forming what promises to be one of the most attractive features in Chief Skiff's department of the great show. It is estimated that the entire display, as it stands when ready for public inspection, will represent an outlay in preparation of \$30,000.

The pagoda will be filled with handsome showcases containing the best specimens of ores and minerals of all kinds that Wisconsin can produce. For instance, there will be one case holding \$250,000 worth of pearls. It was designed by the Beatty Mfg. Company. The display will rest on a platform made of white and black marble tiling, the whole being surmounted by a beautifully-gilded dome, richly ornamented, thus giving the display a showy effect both from the galleries and distant sections of the building.

Fraser & Chalmers' Exhibit.

Fraser & Chalmers of Chicago are preparing a fine exhibit for the Mines Build-

ing. Having been located under the main gallery, the firm found it impossible to secure sufficient height to put in a vertical engine that would have added largely to the attractiveness of the exhibit. This also prevented the introduction of a ten-stamp combination silver and gold mill, which, in operation, would have attracted probably as much attention as almost anything at the Fair. However, these drawbacks will not interfere with the company's arranging a very fine display of modern mining machinery.

In the array of what may be classed as most interesting devices shown will be water-jacket smelting furnaces for smelting copper, silver, lead and tin, a concentrating machine, light and heavy crushing machines for grinding ore, sundry smelting devices, lead and silver smelting furnaces, copper furnaces, copper converters for Bessemerizing purposes, and all the apparatus that enters into the metallurgy of gold, silver, copper, tin and lead.

Besides these devices there will be a 20 x 40 Corliss engine adapted to the Riedler air compressor, a twin compound engine adapted to the Riedler pump, and a standard hoisting engine. The triple expansive vertical condensing winding engine, which is 23 feet high, cannot be set up in the center of the exhibit. This engine is a reproduction of four others made for the De Beers diamond mines of Kimberley, South Africa. It will probably be set up in Machinery Hall. Fraser & Chalmers will also have an engine of 1000 horsepower in the power plant of that department.

Spain at the Exposition.

Advices have been received from Spain that January 28 the first consignment of exhibits was sent to Chicago, consisting of 500 cases of various objects. One of the most interesting exhibits will be that of the War Department, which intends to send to Chicago a rare collection of ancient artillery of the kind used in the days of Columbus. There will be lombards and falconets, cannons and mortars, shells and projectiles of every description, all of Spanish manufacture; and in addition there will be an exhibit of modern war materials, together with books and pictures of all the gun factories and war materials of Spain. In the city of Tarrasa great activity has already been displayed, and a large exhibit of manufactures of that town is being collected for the exposition.

The Fair Will be Closed on Sundays.

Exposition officials were not wholly surprised, but were greatly disappointed by the action of Congressman Durbin's committee in declining to report the Houk bill. A majority of the directors feel convinced that the Sunday opening movement is dead, and little effort will be made to do anything more with Congress in that matter. F. W. Peck, chairman of the Finance Committee, is hopeful that there will be a special session of Congress and that there may be a fighting chance then to secure favorable legislation. But in his hope he is not generally supported by his fellow directors.

Director-General Davis declines to discuss the question. He said he was a national officer and bound to obey the dictates of Congress. He would say nothing further than if the law were not repealed the fair would be closed on Sundays so tight that nobody could get into it. It is not believed that the directory will take any steps toward undoing the act of the last session of Congress.

A Deserved Promotion.

Frederick Sargent, mechanical and electrical engineer of the exposition, was promoted to a position in which he will have several assistants to perform under him the work of the department. The

work was divided into two divisions. The mechanical engineering section will be in charge of Robert Pierce. Mr. Sargent will remain at the head of the two divisions and direct the work of both.

Deterioration of Condenser Tubes in the United States Steamship "Baltimore."

From "Notes on the Year's Naval Progress," an annual issued by the United States Navy Department, we take the following interesting article on the condenser tubes of the "Baltimore":

A singular instance of deterioration of condenser tubes was reported from the United States steamship "Baltimore" in January of the present year. The condenser of this vessel is of English design, and fitted, according to the custom very generally adhered to until recently in vessels of the English navy, for the passage of the exhaust steam inside the tubes and of the condensing water outside, an arrangement the reverse of American practice, as well as of the practice of the English mercantile marine. The vacuum obtained in the condenser having been for some time impaired, while the "Baltimore" was actively employed in cruising, on account of the accumulation of large quantities of mud on the salt-water side of the tubes, advantage was taken of the opportunity afforded during the stay of the ship at Mare Island to remove the tubes in order to clean out the mud. In the process of taking out the tubes it was incidentally discovered that some of them were very brittle, although there was nothing in their outside appearance to indicate that deterioration had taken place. Further examination disclosed the fact that all of the tubes were in the same condition, and could be broken in the hand with ease, seeming to have completely lost their elasticity. The tubes of the auxiliary condenser, similarly arranged for the passage of steam on the inside, were found to be in still worse condition than those of the main condenser, about one half of the tubes having their lower ends, near the point of admission of the circulating water, eaten away to such an extent that this condenser was practically transformed into a jet condenser. A board of survey was ordered, with the result that all the tubes of both condensers were replaced by new ones.

An investigation into the causes of the deterioration was made by Assistant Engineer A. M. Hunt, United States Navy, whose report was indorsed by the Board as a portion of its finding. Before quoting the principal portions of this interesting report, it should be explained that the condenser tubes of the "Baltimore" are arranged in two nests, an upper and a lower; the circulating water is admitted to the space outside the tubes at one end of the lower nest, and, at the opposite end, passes up to the space outside the tubes of the upper nest, after traversing which it is discharged outboard. The deposits of mud outside the tubes of each nest were greatest at the ends furthest from the point of admission of the circulating water, extending at these ends to the top of the chamber in each case. In both nests of tubes the deterioration was found to be greatest at the ends nearest the point of admission of the circulating water, while the tubes were least affected where protected by the deposits of mud. The following extracts are made from Mr. Hunt's report:

"I first examined a large number of tubes, removing the adhering mud and grease. In all cases I found the tin coating on the inside of the tubes bright and intact. The outside surfaces were dull in

appearance, and, rubbing them down with canvas, I found the tin coating entirely gone in spots. Some tubes had hardly any tin on the outside surfaces. Wherever the tin coating remained, on scraping it off I found yellow metal underneath. On scraping down where the tin coating was gone the metal was coppery. The coppery metal was so brittle as to be easily broken in the fingers. Its fracture was dull reddish brown in color, and examination under the microscope showed it to be porous or spongy. The yellow metal was tough and apparently unchanged. The lines of demarcation between the two colors were clearly defined, with no shading of one into the other.

"Chemical analysis revealed the following facts; they are not the results of single analysis, but the averages of repeated determinations: The reddish-brown metal proved to be copper of a purity from 99 to 100 per cent., and showing not even a trace of zinc. The yellowish metal was brass of a composition of copper, 60 per cent., zinc, 40 per cent., with a trace of lead, and samples taken as close to the red metal as possible showed no material variation from these figures. The mud was found to contain only inert substances. Loss by ignition (water and organic matter), 12.1 per cent.; silica, 40.4 per cent.; alumina, 32.9 per cent.; lime, 4.6 per cent.; salt, 6.3 per cent.; total, 96.3 per cent. The remaining 3.7 per cent. was probably carbonic acid (CO_2) combined with the lime. I found small pieces of shell in the mud, and calculating the lime as calcium carbonate gives a total percentage of 99.9. The mud contained a certain amount of uncombined silica as sand, and was quite gritty.

"To determine the original composition of the brass in the tubes, I took samples from several spare ones, said to be of the same lot as at first put in. Their average analysis gave: Copper, 60 per cent.; zinc, 39 per cent.; no tin; lead, 0.25 per cent.; iron, mere trace. Scrapings of the tin coating on one of the spare tubes gave: Loss by washing in ether (grease and oil), 4 per cent.; tin, 22 per cent.; lead, 65 per cent.; copper, 4 per cent.; zinc, 2 per cent.; unaccounted for, 3 per cent. Part of the unaccounted-for material was probably oxygen combined with a portion of the lead. The copper and zinc undoubtedly came from particles of the brass mixed with the scrapings of the coating.

"The action by which the zinc was removed from the metal of the tubes evidently progressed from the outside of the tubes toward the inside, as evidenced by the unbroken tin coating inside, and the fact that numerous samples were found where the outside metal was changed to copper with an interior shell remaining brass. As the change started and worked from the salt water side of the tubes, any theory with regard to the action being the effect of the fresh water or grease is untenable. As the mud found in the condenser contains only inert substances, no chemical action could have taken place with it as an agent. The complete removal of zinc from the alloy seems to indicate a galvanic action, which is always accomplished by the destruction of the electro-positive element. The sharp lines of demarcation of the altered portions, and the way in which the alteration has spread from the centers, giving some specimens a blotched appearance when polished, would indicate that the galvanic action had taken place between different parts of the same tube, and not between the metal of the tube and some outside body.

"The following is, to my mind, the only rational explanation of the action which has taken place that can be deduced from the facts as above cited. To have accumulated so much mud in the condensers, a

very large quantity of it must have been swept through, and, containing a considerable quantity of grit, it would abrade the tinned surface of the tubes. This abrasion would be rendered more rapid, owing to the fact that the tin of the coating contained such a large percentage of lead as to be quite soft. The fact that the tubes were most affected and the tin coating most removed at points where the currents of water moved transversely to the tubes, and that the tubes were least affected where the deposited mud protected them from the abrading action, renders this explanation of the manner of the removal of the tin coating extremely probable. When the tin coating had been

moved from a portion of the brass, pure copper was left behind in a spongy state, and it formed a couple with the adjacent brass, and the action spread from it as a center. If the copper so left were not spongy enough to absorb water, the action would probably have ceased after the surface had been thus copper plated, but, being spongy, it enabled the action to progress through the thickness of the tube.

"To prove that copper will absorb water, I weighed a piece, after thoroughly cleaning it, and then placed it in distilled water for one-half hour. I then removed it, and after carefully drying the outside of it, reweighed. I found it had absorbed

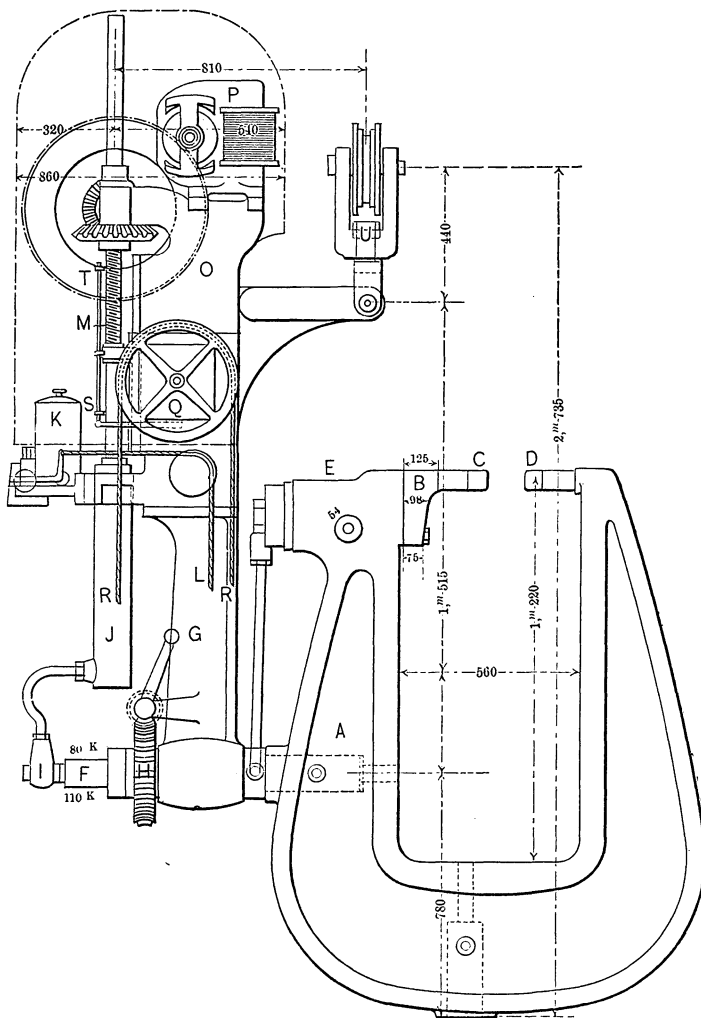


Fig. 1.—General Arrangement.

THE PIAT ELECTRIC RIVETER.

removed at any one point, there was then left a brass surface exposed, adjacent to and intimately connected with a tin (tin-lead alloy) surface, and covered by an exciting liquid, sea water. That under such circumstances galvanic action would take place between the two metals cannot be questioned, and one element or the other of the local battery so formed would undoubtedly be attacked. To prove the existence of a current in a couple similar to the above, I immersed two sections of condenser tubing, from one of which the tin coating had been removed, in salt water, and found a very perceptible current, using a galvanometer that was not at all sensitive. Zinc is the most electro-positive of all the common metals, and would in such a couple be the metal destroyed, and that it was destroyed in the altered metal of the tubes is shown by the analysis. As soon as the zinc was re-

removed, there was then left a brass surface exposed, adjacent to and intimately connected with a tin (tin-lead alloy) surface, and covered by an exciting liquid, sea water. That under such circumstances galvanic action would take place between the two metals cannot be questioned, and one element or the other of the local battery so formed would undoubtedly be attacked. To prove the existence of a current in a couple similar to the above, I immersed two sections of condenser tubing, from one of which the tin coating had been removed, in salt water, and found a very perceptible current, using a galvanometer that was not at all sensitive. Zinc is the most electro-positive of all the common metals, and would in such a couple be the metal destroyed, and that it was destroyed in the altered metal of the tubes is shown by the analysis. As soon as the zinc was re-

From a decision of the Court of Appeals it appears that during the past 25 years this State has collected over \$2,000,000 in taxes provided for under a law which was declared unconstitutional in 1846 and was repealed in 1868. This tax was $\frac{1}{4}$ of 1 per cent. on the value of foreign merchandise sold at auction in this State. The advisability of bringing suits to recover the amount of taxes thus illegally collected is being considered.

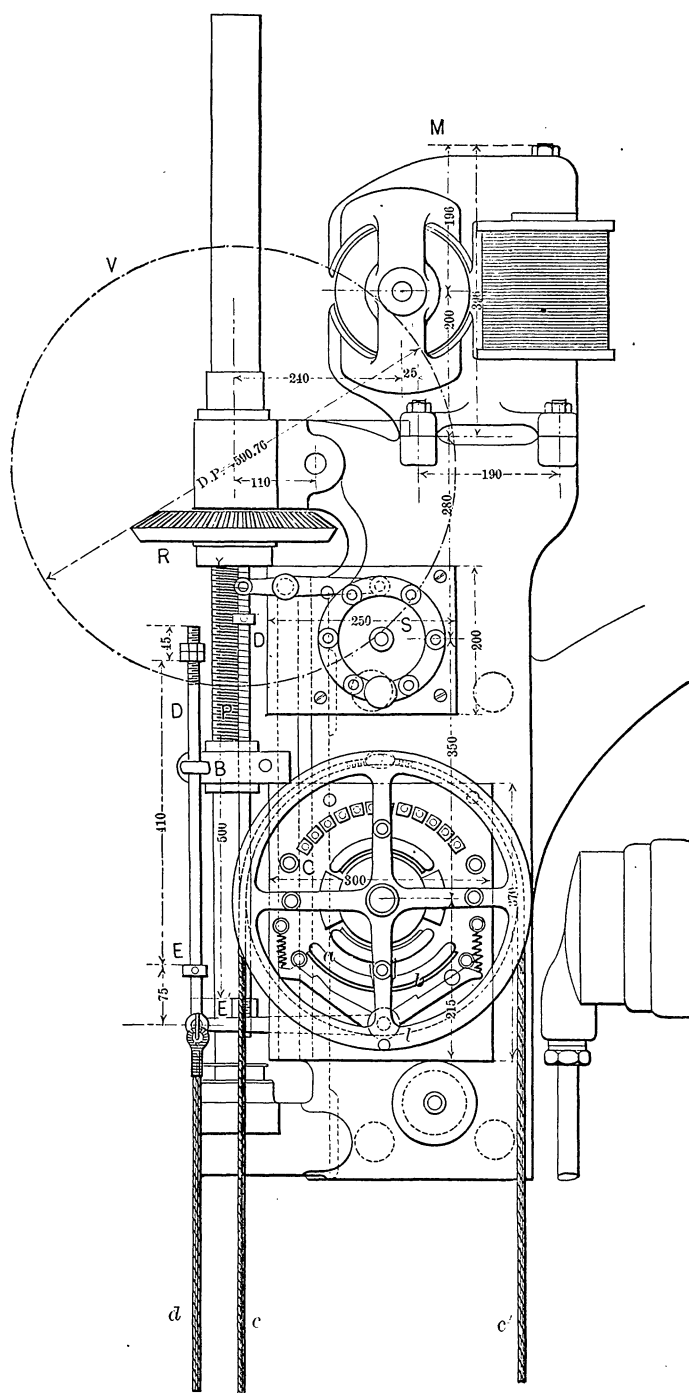


Fig. 2.—Details of Operating Mechanism.

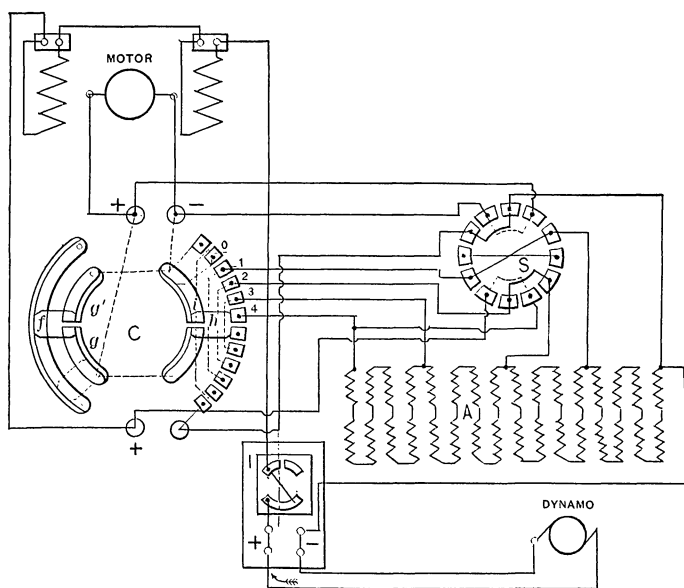


Fig. 3.—Electrical Connections.

THE PIAT ELECTRIC RIVETER.

The Piat Electric Riveter.

The idea of utilizing electricity as the power for operating portable riveting machinery has been given consideration by a number of designers. Thus far, however, nothing has appeared in the public prints to indicate that it has been carried out in practice. In a lengthy article, the *Génie Civil* deals with the riveting machinery now largely employed in France, which is built by A. Piat of Paris and Soissons. Our contemporary describes the hydraulic riveters used and goes into considerable detail on the installation at works of magnitude. Special interest attaches, however, to the electric riveters, although that possibly is a misnomer, since the actual riveting is done by hydraulic pressure, the electric current being utilized to operate the power pump. In other words, the electricity is employed as a substitute for a long line of high pressure pipe.

The general design of the riveter is illustrated in Fig. 1. A motor, P, drives a geared fly wheel, which, through bevel gear, raises and lowers the plunger in the pressure cylinder J, fed with a supply of water and glycerine from the small tank K. The pressure water is conducted through the pipe I F to the riveting cylinder.

The electrical outfit, which was designed by Sautter, Harlé & Co., consists of a switch, I, Fig. 3, a commutator, C, Figs. 2 and 3, the principal function of which is to automatically control the motor and the safety commutator S, Figs. 2 and 3, which operates only when C fails to work. The starting is effected with the aid of a rheostat, which is switched into the circuit or cut-out, as desired, by the commutator C. The cord *c* is drawn until the commutator engages at *b*, Fig. 2. The current then flows from the dynamo, through the switch to the motor and passes through the movable contact *f*, Fig. 3, which then occupies the position indicated by dotted lines, the sequent *h*, the motor, the sequent *i*, the contact *h*, and back through the switch to the dynamo. It will be observed that the current does not flow through the rheostat. But if the contact piece *h* were at the point 2, Fig. 3, for instance, one-half of the rheostat A would be interposed. In starting the motor causes the screw P to rise, carrying with it the tappet B, which, during the stroke, meets D and takes along the lever which carries it. This lever is journaled at L, releases the catch *b*. The movable contacts of the commutator C, actuated by an interior spiral spring, return automatically to the position of repose shown in the drawing.

If the diagram be consulted it will be seen that at this moment not only is the rheostat interposed, but also that the bobbin of the motor is in a circuit of very feeble resistance through the contacts *g*, *f*, *g'*, *i*. It thus develops considerable work, which quickly stops the fly wheel. If for some possible reason the short-circuiting of the bobbin did not take place, serious damage to the mechanism might be done. The commutator S is intended to prevent this accident. When the release of *b* does not operate the piston continues to rise. B strikes D' and releases the commutator S, which, actuated by a spring, turns, and its connections then make the dotted circuit in Fig. 3.

The return stroke of the piston is produced by drawing the cord *c*, Fig. 2.

The operations are so simple that two rivets a minute may be set in ordinary bridge work. At the Gien bridge the stroke of the hydraulic piston takes four to six seconds.

The Rogers Locomotive Company, of Paterson, N. J., have reorganized and increased their capital to \$3,000,000.

Shops Operated by Compressed Air.

At East St. Louis there is a manufacturing plant that is the most notably interesting that it has been our fortune to visit—interesting not so particularly because of design, great extent or enormous output, or because of special processes or methods, but because of the fact that the sole power employed in working the various tools is compressed air. As far as we know, this plant is the first and only shop in this country which uses air exclusively for power.

For several years past compressed air has been used for various tools, but a shop

summer, all operations incident to the manufacture of the various parts used in the Wuerpel interlocking signal system and of the Wuerpel steam wrecker (aside from the operations of casting) are handled by compressed air power.

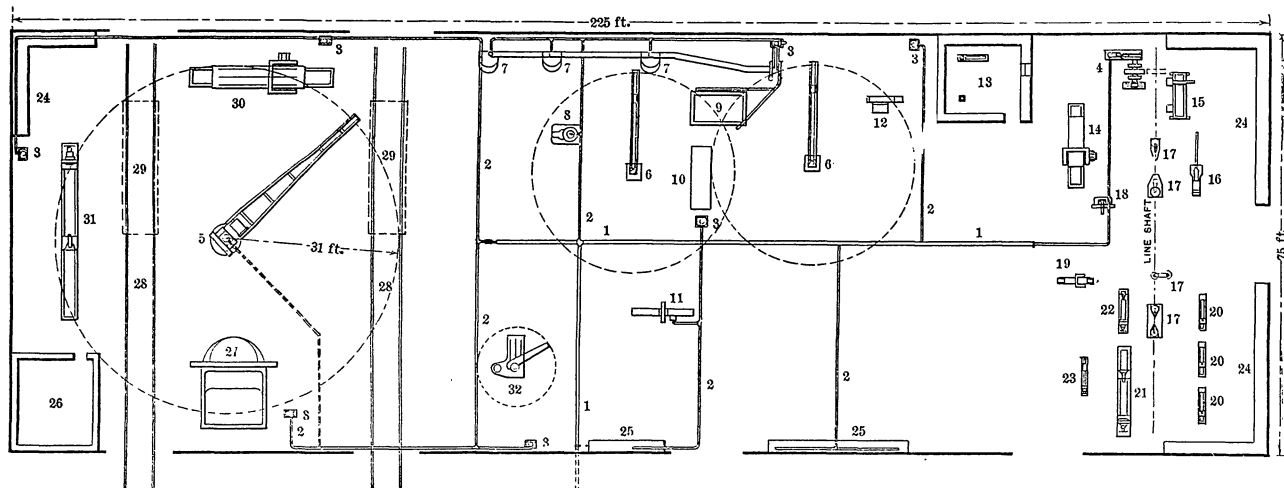
In our engravings Fig. 1 shows the floor plan of the machine shop (the location of the air piping and of the various tools being indicated by figures); Fig. 2 gives a ground plan of the entire plant; Fig. 3, a floor plan of the power house. These figures show clearly the general arrangement of the works and the position of the most important machines.

Power is supplied to the entire plant by a compound Norwalk compressor rated at

Kriebel make, ranging in rated power from 2 to 8 horse-power.

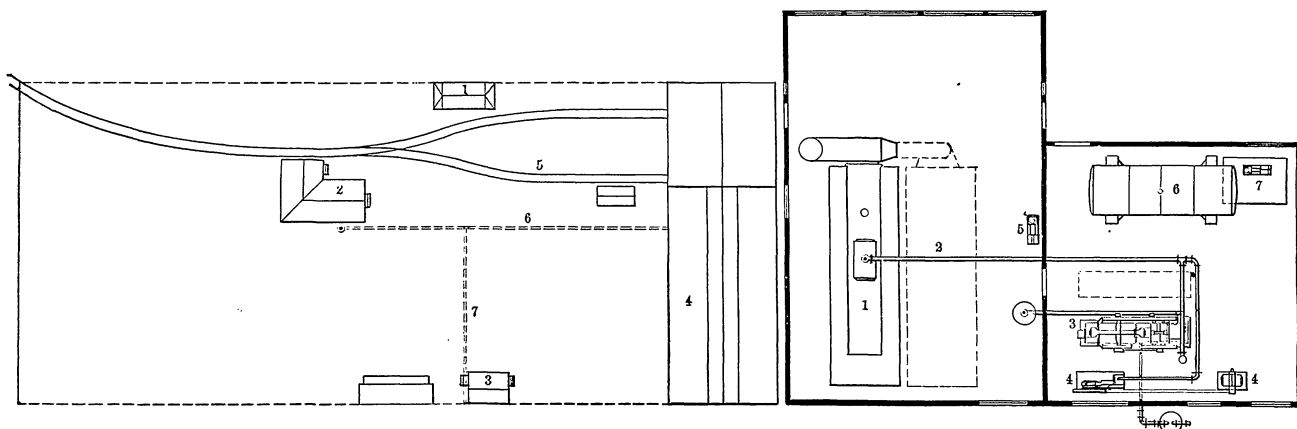
It will be noted that the shop is well equipped for its purposes with modern tools. The 20-ton power crane (operated by air) is home-made, and is strong, efficient and cheap. It is needed for the heavy work on the Wuerpel steam wreckers, two of which interesting machines are just about to be turned out. We expect to very soon illustrate these wreckers. There are also two hand cranes serving the power hammer, bulldozer, heating furnace, &c.

It is estimated that the saving in the operation of this plant effected through the use of air for power is from 15 to 20



1. Main Air Pipe. 2. Branch Pipes. 3. Engines for Large Tools (Kriebel). 4. 6x14 Engine for Small Tools. 5. Power Crane. 6. Hand Cranes. 7. Forges. 8. Hammer (Morgan Engineering Co.). 9. Oil Furnace. 10. No. 5 "Bulldozer" (Williams, White & Co.). 11. Punching and Shearing Machine (No. 2 Long & Alstatter Co.). 12. Cold Saw (Newton Machine Tool Works). 13. Tool Room. 14. 30x30 Planer (Niles). 15. Shaper (Niles). 16. Horizontal Boring Machine (Niles). 17. Drill Presses. 18. Milling Machine (No. 2 Brainard). 19. Jumper (C. Whitcomb & Co.). 20. Lathes, 14 inches, 6 foot bed (Flather & Co.). 21. Lathe, 24 inches, 16 foot bed (Lodge, Davis & Co.). 22. Turret Lathe (Lodge, Davis & Co.). 23. Benches. 24. Testing Benches. 25. Stock Room. 26. Boring Mill (Niles). 27. Tracks. 28. Pits under Tracks. 29. 50x50 inch Planer (Niles). 30. Bending Roll. 31. Radial Drill (7 foot Rad. Niles Tool Works).

Fig. 1.—Wuerpel Air Operated Shops.



No. 1, Offices. No. 2, Air Compressor and Light Plant. No. 3, Pattern Shop. No. 4, Machine Shop. No. 5, Tracks. No. 6, Air Pipe to Machine Shop. No. 7, Air Pipe to Pattern Shop.

Fig. 2.—Wuerpel Shops, Ground Plan.

No. 1, Boiler (John O'Brien Boiler Co.). No. 2, Steam Pipe. No. 3, Compressor (Norwalk). No. 4, Light Plant. No. 5, Feed Pump. No. 6, Water Tank. No. 7, Pump. No. 8, Air Receiver.

Fig. 3.—Wuerpel Shops, Power House.

SHOPS OPERATED BY COMPRESSED AIR.

plant in which all tools and appliances, from a 20-ton crane to a small tool grinder, are operated by air is a decided novelty.

The plant where this is done is that of the Wuerpel Switch & Signal Company, located as above stated, at East St. Louis. Mr. Wuerpel has had long experience with compressed air in connection with his signaling and interlocking work on the St. Louis bridge, tunnel and terminals. In the small shops of the bridge and tunnel company there have been for some time a number of tools operated by compressed air on plans designed by Mr. Wuerpel.

In the works of the Wuerpel Switch & Signal Company, which were erected last

55 horse-power. The air is stored in a reservoir just outside the power house, and is piped thence (beneath the ground) to the machine shop and to the pattern shop. The piping in the machine shop is overhead and serves each tool directly, except at the lower end of the shop, where a number of the smaller tools, lathes, drill presses, &c., are grouped and are served through a smaller set of line shafting. In all other cases it will be noticed that each tool has its own engine, located immediately at its base or at a contiguous wall. With the exception of the engine used to run the line shafting for the small tools, all the engines in the machine shop and pattern shop are of the

per cent., although no actual figures have as yet been collated. It will at once be perceived that under this system tools can be placed exactly where wanted, regardless of the usual limiting conditions introduced by the use of line shafting. This insures under proper management economical methods of handling material from the rough to the finished state. The absence of line shafting, with its heavy draft upon power and its expensive maintenance, insures another element of saving. There will be no waste of power, for the simple turning of a cock starts up an engine and its tool; and the moment the particular job is finished, turning back the cock instantly stops the draft upon the

power supply. The tools are always ready at instant command, but become idle and cease eating up coal the moment they have performed their service. The initial cost of the power plant, including cost of the engines at each tool, was about equal to the cost of an ordinary steam plant, including line shafting, &c.

These shops are well lighted and ventilated, the ventilation (as well as cooling in summer) being materially aided by the constant discharge of air from the exhausts of the various engines. The shops cost about \$70,000, all told, including the ground. About 100 men have been employed and the force will probably be 150 in March, although not running on this basis just now.

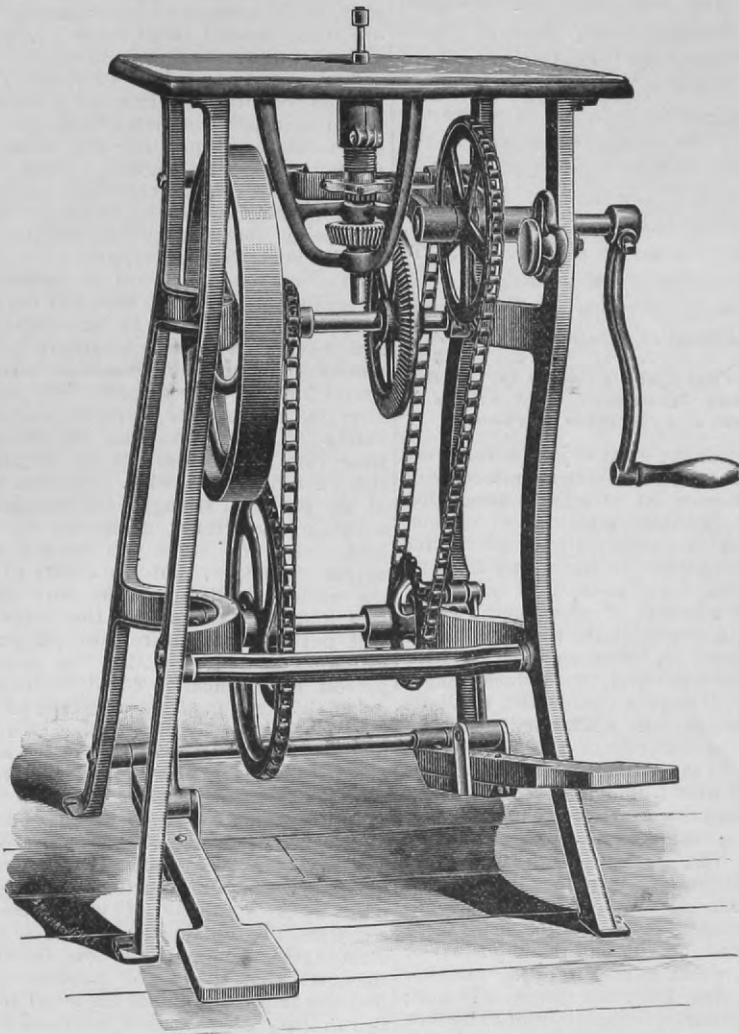
The shops are operated by the following staff: M. Wuerpel, vice-president and su-

perintendent; F. A. Lapham, general manager; M. Wuerpel, Jr., superintendent of erection; George Ross, electrician; O. H. Jackson, general foreman; C. N. Macfarland, chief draftsman.—*Railway Age*.

average price of silver during the year, of \$50,750,000, and of the coining value in silver dollars of \$74,989,900. This is a falling off of 1,330,000 ounces from the product of the preceding year. The total silver product in the world increased during the last calendar year about 7,650,000 ounces, occasioned by an increase of 4,600,000 ounces in the product of the Mexican mines, and 3,400,000 in the product of the mines of Australia.

The Rex Molder.

The edge molding or shaping machine shown herewith is designed for all wood-workers who are called upon to finish straight, circular, curved, or irregular



THE REX MOLDER.

work with molded edges. It has an iron frame, steel spindle and shafts, babbitt lined boxes and hard wood table. The Seneca Falls Mfg. Company, Seneca Falls, N. Y., who make the device, state that the machine is easily and accurately adjusted up and down by simply turning a hand screw, while adjustable boxes take up the wear. The foot power has a walking motion, enabling the operator to run the machine with both feet sitting, or one foot standing. The molding cutters are reversible and the spindles may be run either way to suit the grain of the wood. The power is transmitted, as will be seen by the engraving, by a chain belt and gears. The machine is designed especially for edge molding, using cutters up to 1 inch face, but if desired the spindles can be readily adjusted so as to cut beads, flutes or other styles of moldings in the center of a 4-inch panel.

Southern Notes.

Pending the next meeting of the Tennessee Coal, Iron & Railway Company to confirm the election of the officers and to ratify the new organization, nothing positive has been given out by the officials in regard to the future policy of the company, but it is rumored that the erection of a steel plant at Bessemer has been definitely decided upon. The Tennessee Coal, Iron & Railway Company have leased the works of the Henderson Steel Company at North Birmingham, and are now making exhaustive tests with Alabama irons by the open-hearth process. This is announced by chemists and experts, who have analyzed the samples of steel already made, to be an unquestioned success. The company are proceeding carefully, but those in a position to know now state that such success has been met with as to leave no doubt that the proposed steel plant will be erected.

The new Rome (Ga.) furnace is now in full blast, after having been idle for three weeks. It is turning out 45 tons per day of a high grade iron, which finds ready sale in Boston, Pittsburgh, Cincinnati and Chicago.

Another large shipment of machinery was received last week for the South Boston Iron Works at Middlesborough, and work is being pushed as rapidly as possible. It is stated that the plant will be in operation May 1. Employment will be given to 500 men.

Arrangements are about completed for the resumption of work at the Chattanooga (Tenn.) Stove Company's plant. They will be operated to their full capacity and 100 men employed.

The North Alabama furnace at Florence, Ala., will go into blast between the 1st and 15th of March, and will make spathite iron from the ore found near Florence. This furnace has been undergoing extensive repairs, which are now about completed.

The Cartersville Graphite Company have been organized by C. H. Williams and others of New York, to locate a plant at Cartersville, Ga., to grind and pulverize graphite for foundry use.

The Newport Iron & Brass Foundry Company, with a capital of \$10,000, have been organized at Newport, Ky., by Philip Diehl, J. Marshall and associates, to manufacture iron and brass castings.

The Edes, Mixter & Heald Zinc Company of Knoxville, Tenn., are erecting two new furnaces.

The Panhandle Hardware Company, capital, \$100,000, have been chartered at Wichita Falls, Texas, by H. M. Durrett, B. F. White and others.

The Bluffton Car Wheel Company, Bluffton, Ala., are in the hands of a receiver.

Benjamin Talbot, formerly superintendent of the Southern Iron Company, Chattanooga, is still continuing his experiments in desilicizing Southern low grade iron. He is now experimenting in a furnace at Birmingham, and is said to be meeting with encouraging success.

The large car works at Basic City, Va., which have been idle for the past eighteen months, have been leased to a Northern firm, which will put them in operation in a few weeks. They already have some large orders, and will employ 250 men. The plant is equipped with first-class machinery.

Chas. A. Brusle, P. S. Postell, Jr., and others, have applied for a charter for the C. A. Brusle Hardware Company of Iberville, La. The authorized capital is \$10,000, with right to increase to \$25,000.

Erastus Wiman retires from Dun & Co.'s commercial agency on account of the pressure of other engagements.

THE MINING ENGINEERS.

THE MONTREAL MEETING.

A somewhat unusual condition of affairs was encountered by a number of the members of the American Institute of Mining Engineers in their efforts to reach hospitable Montreal. The Philadelphia delegation, traveling in a body, contrived to dawdle over their trip for 27 hours, gaining some time, however, in securing a special engine to carry them from Rouse's Point to Montreal. Other groups recorded delays ranging from three to six hours.

In spite of these drawbacks a considerable body of engineers were gathered to receive the welcome to be extended to them by His Excellency Lord Stanley of Preston, Governor-General of the Dominion; the Hon. T. Mayur Daly, Minister of the Interior; the Hon. E. J. Flynn, Commissioner of Crown Lands, and the Mayor of Montreal. All of these dignitaries were detained, so that the first words of hospitality came from the Hon. George Irvine, president of the Quebec Mining Association, who throughout the meeting devoted himself heart and soul to the visitors. Dr. R. W. Raymond responded on behalf of the Institute. The president, John Birkinbine, then delivered an address on "The Development of Technical Societies."

Among the members present were the following:

John Birkinbine, Philadelphia.
R. W. Raymond, New York.
Dr. David T. Day, Washington.
H. M. Howe, Boston, Mass.
P. W. Moen, Worcester, Mass.
A. Heckcher, Philadelphia.
R. G. Leckie, Londonderry, N. S.
E. W. Pullman, Philadelphia.
G. T. Barns, Philadelphia.
W. E. C. Eustis, Boston, Mass.
E. E. R. Tratman, *Engineering News*, New York.
S. T. Wellman, Thurlow, Pa.
Professor Richards, Boston, Mass.
Oliver Williams, Catasauqua, Pa.
W. L. Scaife, Pittsburgh, Pa.
R. Allisob, Pottsville.
Horace See, New York.
James Archbald, Scranton, Pa.
L. W. Francis, Port Henry, N. Y.
Chas. Archibald, Cow Bay, N. S.
E. Lynwood Garrison, Philadelphia.
Professor T. Egleston, New York.
A. L. Inman, Plattsburg, N. Y.
A. Blue, Toronto.
Dr. C. Willard Hayes, Washington.
H. G. Torrey, New York.
H. McCormick, Jr., Harrisburg.
W. P. Blake, Shullsburg, Wis.
W. Ayres, Kenvil, N. J.
W. S. DeCamp, New York.
A. J. Rossi, New York.
Prof. J. C. Smock, Trenton, N. J.
C. Kirchhoff, *The Iron Age*, New York.
Clarence R. Claghorn, Philadelphia.
A. E. Lehman, Philadelphia.
J. H. Jones, Iron Mountain, Mich.
Dr. Robert Bell, Ottawa, Canada.
Richard Peters, Wellman Iron & Steel Company, Thurlow, Pa.
H. V. Winchell, Minneapolis, Minn.
J. P. Pardee, Stanhope, N. J.
Frank S. Witherbee, Port Henry, N. Y.
Walter Russell, Russell Wheel & Foundry Company, Detroit, Mich.
G. A. Bell, Troy Steel & Iron Company, Troy, N. Y.
J. W. Hegeler, La Salle, Ill.
Frank Lyman, Brooklyn, N. Y.

WEDNESDAY.

The morning session opened with the election of new members, about 70 being added to the roll. The annual report of the council showed receipts from all sources for the year ending February 1, including the balance of \$1718.87 at the beginning of the year, of \$26,595.15, and expenditures of \$23,131.27, leaving a surplus of \$3463.88, being an increase of \$1744.99 over the surplus of the previous year. In addition to this, the treasurer holds United States bonds of the par value of \$2900 and a special deposit of \$4598. The membership has increased from 2223 to 2376.

The first paper presented was that of Major J. W. Powell, director of the United States Geological Survey, read by Dr. C. Winshell Hayes, on "The Geologic Map of the United States," the first sheets for the Chattanooga district being shown to the meeting. The principles adopted in the preparation of the map were discussed at length by Professor Selwyn, director of the Canadian Geological Survey. W. P. Blake, Dr. Raymond and Dr. David T. Day participated in the discussion.

F. Lynwood Garrison of Philadelphia read an abstract of a paper on

The Greene-Wahl Process for Manufacturing Manganese and Alloys of Manganese Free from Carbon.

Heretofore the great objection to the use of ferromanganese in the manufacture of steel has been its invariable association with considerable quantities of carbon. Manganese has a very strong affinity for carbon; and when it is derived from its ores by the usual methods of reduction, carbon in a greater or less amount will invariably be present in the resulting metal. When, therefore, ferromanganese is added to a low-carbon steel to produce manganese steel, it usually carries with it all its carbon, which will undoubtedly tend to increase the hardness of the steel, whatever may be the action of the manganese itself. It would therefore seem that the intense hardness which is commonly considered a characteristic of manganese steel is due, in part at least, to the additional carbon introduced with the manganese. In adding ferromanganese to a low-carbon steel some of the manganese is consumed in oxidizing the impurities of the steel, which impurities will, together with the slag, form manganese silicates; and thus a certain proportion of every unit of manganese added will disappear in this manner. There is no reason to believe, however, that the carbon added with the ferromanganese will be oxidized. On the contrary, it is probable that all, or nearly all, of it will be united with the steel as "combined" carbon.

To be able to produce, commercially, a ferromanganese free from carbon would therefore seem to be a most desirable result, as it would then be possible to add such ferromanganese to the steel in order to obtain the undoubted beneficial effect of its manganese, without at the same time increasing the carbon content of the steel. In such a case it is necessary to assume that manganese, *per se*, like chromium, does not harden steel to any great extent. Whether this is the case or not I cannot state, because, so far as I am aware, the fact has never been demonstrated.

The interesting problem of producing on a commercial scale not only a ferromanganese alloy free from carbon, but a material which, for practical purposes, may be considered pure metallic manganese, has, I

believe, been recently solved by the two American chemists whose names this process bears. The object of this paper is to describe this process; and while I will not offer any opinions as to its economic value, I will give some figures which, I trust, may be of interest.

About two years ago Messrs. Greene & Wahl were induced to undertake the search for a method that would yield metallic manganese practically pure and in sufficient quantity to become a commercial commodity; containing not only a minimum of all impurities but being also free from carbon.

At the outset of their work it became evident that the first step in such a process would be to remove the iron contained in the manganese ore, since this iron would undoubtedly become reduced with the manganese. Magnetic separation was the easiest method suggested, and with it they made exhaustive experiments, the ore being treated in all states of division and all conditions of oxidation.

They were compelled to abandon this method because the iron and manganese are so intimately associated in the ore that no satisfactory separation can be accomplished with the magnet. They then tried various electro-chemical methods, the ore being made the anode of baths containing sodium chloride, dilute sulphuric acid, ferrous sulphate, &c. By such means they succeeded in eliminating a certain portion of the iron, but the separation was too slow to be satisfactory and was far from being complete. Convinced that only a chemical method would answer their purpose, they found, after a number of experiments, that nearly all the iron can be removed from rich manganese ore by digesting the pulverized ore with sulphuric acid of 30 per cent. strength, the manganese remaining practically unaffected by the acid. At first sight this method may appear expensive; but the ability to use the waste acid by treatment with scrap iron and thus to recover the copperas, will pay for the entire cost of purification indicated; so that no cheaper process of purification could be desired. As an illustration of the efficiency of this method, it may be stated that in a few hours the percentage of iron in the manganese ore may be reduced from five or six to a few tenths, without any perceptible effect upon the manganese in the ore.

The process of Messrs. Greene and Wahl has thus far been conducted only on a laboratory scale in crucibles yielding at most 2 or 3 pounds of manganese at a charge. To obtain the manganese in a state of reasonable purity it was found at the outset that the use of graphite crucibles was impracticable, as the metal at the temperature of reduction saturated itself with carbon from the crucible. After experimenting with various materials with which to line graphite crucibles it was found that magnesia gave results entirely satisfactory, and that in graphite crucibles lined with calcined magnesite a manganese could be produced containing only small percentages of impurities. A number of reductions were made yielding in this manner metallic manganese of very uniform quality and having an average composition as follows:

Manganese, 96.5; iron, 2; silicon, 1.5 (sulphur and phosphorus undetermined). It is an interesting fact to note in this connection that only the merest trace of aluminum, if any, is retained by the manganese.

This metal is dense and homogeneous, with a steel-gray color and a pinkish to reddish bronze tint. It has an irregular fracture, it is hard and brittle; when containing over a certain amount of silicon the luster becomes more brilliant and the fracture distinctly conchoidal. When cast in iron molds it is often observed to have

become fractured and fissured, the fresh surfaces exposed by such fissures and fractures being often covered with an exceedingly thin film of tombac-brown oxide. The metal exhibits no tendency to oxidize and disintegrate in moist air, as does all the manganese reduced by and containing considerable amounts of carbon. It is soluble in dilute acids and practically infusible at ordinary furnace temperatures.

The specific gravity of a number of specimens prepared by this method was found to vary between 7.26 and 7.38, or an average of 7.32. To what extent the presence of small percentages of impurities in the metal may affect its physical properties it is impossible to say.

For practical purposes there can be little gained in removing the small amount of iron present in the manganese ore, and no attempts have yet been made on the part of Messrs. Greene and Wahl to produce the metal from absolutely pure ore. Except for scientific interest, the absolutely pure manganese which might thus be prepared would hardly be worth the trouble. These gentlemen propose, however, in the near future, to prepare a quantity of such pure manganese in order to determine the absolute specific gravity, specific heat, and other physical and chemical constants of interest.

One peculiar and marked characteristic of nearly all metal prepared by this process is that, when freshly fractured surfaces are moistened by blowing upon them with the breath, the metal emits a peculiar pungent odor resembling garlic, which is possibly due to the presence of hydrogen silicide, since this peculiarity is not so noticeable when the metal contains less than 1 per cent. of silicon.

The method of producing the specimens shown is as follows: The manganese dioxide (MnO_2) was reduced to the state of monoxide (MnO) by heating to dull redness in a stream of reducing gas, this preliminary reduction requiring about an hour. The monoxide thus obtained must be permitted to cool down entirely in the stream of gas before exposure to the air, otherwise it will immediately be converted into the red or proto-sesquioxide (Mn_2O_3), often with sufficient energy to ignite spontaneously if exposed to the air while even moderately warm.

The monoxide is then mixed with the calculated quantity of aluminum, preferably in the granulated condition, in order to have the advantage of the increased surface, and with the flux of lime and a small quantity of fluorspar, which will vary according to the nature of the impurities contained in the ore. The mixture is then introduced into the magnesialined black-lead crucible, covered with a lid and placed in a furnace. The furnace used in making these specimens was one commonly employed in melting brass. The mass in the crucible remains unaltered, save for some shrinkage, until it has reached a bright red throughout. At this stage the energetic reducing action of the aluminum upon the manganese monoxide sets in and proceeds with great energy for a few minutes until completed. The heat liberated in this reaction is sufficient to liquefy the contents of the crucible and bring it to an intense white heat. A slight fuming proceeding from the crucible gives evidence that the reaction is going on. If the metal is to be poured, it should be done at the moment that liquefaction appears to be complete. The temperature of fusion of the metal is so high that only the enormous amount of heat developed by the reaction is sufficient to liquefy the resulting metal, and the temperature attained is very much higher than that of the furnace. If this high heat is permitted to dissipate itself, the metal chills and pouring is impossible.

The inventors inform me that they have obtained a yield as high as 2.84 parts of manganese per unit of aluminum, which is equivalent to 94.5 per cent. of the theoretical yield. Their ordinary yield, they state, has been between 2.5 and 2.6 of manganese per unit of aluminum. These results are certainly remarkable, as the conditions of working on a small scale are commonly such as to increase the ratio of losses.

One pound of aluminum will theoretically suffice for the production of 3 pounds of manganese from its monoxide. The cost of the operation will obviously depend chiefly upon the cost of the aluminum.

In operating a small plant that will produce about 2 tons of manganese per week, the inventors state that it will require 730 pounds of aluminum and 2.5 tons of manganese ore to produce 1 ton of metallic manganese. Basing their calculations upon the present market value of aluminum at about 55 cents per pound, and the manganese ore at \$40 per ton, they find that the manganese will cost about \$760 per long ton, which price includes the cost of fuel, fluxes, wages, interest and other general and incidental expenses. Of course the wages and incidental expenses can only be approximated; \$760 per long ton, or about 84 cents per pound, certainly cannot be considered a high price for the cost of the metal when we take into consideration the elementary condition, in a commercial sense, of the process.

Very little is actually known of the action of manganese *per se* upon iron or steel, beyond the bare fact that it acts, to a certain extent, as a deoxidizer, for the simple reason that heretofore it has not been possible to produce any considerable quantity of manganese or ferromanganese free from appreciable quantities of carbon and silicon. In adding ordinary ferromanganese to iron or steel, it is impossible to conjecture the specific effect of the manganese, since its action will be obscured or modified by the presence of carbon or silicon, although present in comparatively small amounts.

That manganese acts similarly as a deoxidizer upon both iron and copper, thus refining and adding to the strength of these metals, there can be no doubt. While the presence of the accompanying carbon has little or no influence upon the copper, the iron and silicon have. The fact that the presence of iron is an undoubted benefit to the copper was demonstrated many years ago by Rosthorn, Aich, Dick and others.

The silicon possibly acts upon the copper, along with the manganese, as a deoxidizer. With iron and steel the effect of the carbon and silicon in the ferromanganese must be potent, the extent of this influence depending, of course, upon the quantity of these elements present.

There will surely be a demand in the future for such practically pure manganese as is made by the process described in this paper if it is possible to manufacture it at a sufficiently low cost; and this will evidently depend upon the market value of aluminum. There would seem to be no reason to doubt that the cost of aluminum will gradually become less as the demand and production increase, which is sure to be brought about by improved methods of reducing the aluminum from its ores.

DISCUSSION.

H. M. Howe of Boston stated that it was an open question whether the hardness of manganese steel was partly due to carbon.

E. J. Phillips of New York referred to a series of experiments recently conducted by him to manufacture ferromanganese in an electric furnace. Thus far the highest grade attained has been only 56 per cent,

but it is hoped that a better product will be attained. The reduction of alumina was also tried. Imported German alumina was boiled down with tar to dryness and charged into a carbon pot with lime and copper, with a current of 2500 to 3000 amperes and 500 volts. The product contained per cent. of metallic calcium. When the 4 alumina was excluded and only tar and lime were subjected to the current a gray porous matter was obtained, which when dropped into water caused a great flame to arise from it. It is believed that the material is metallic calcium in a very fine state of division. Dr. Raymond stated that under most favorable conditions at the present time aluminum cannot be produced for less than 18 to 20 cents per pound.

Professor W. P. Blake of Shullsburg, Wis., was called upon to present abstracts of three related papers: "The Mineral Deposits of Southwest Wisconsin," "The Separation of Blende from Pyrites," and "A New Form of Furnace for Roasting and Oxidizing Ores." The lead and zinc ore deposits were discovered by the early settlers and were made the subject of the first systematic geological work carried out in this country. After the lead ores were partially exhausted, the accumulated zinc ore, smithsonite or "bone" of the miners, and later the blende which was discovered below water level, was mined. The smithsonite, which is the weathering product of the blende, is shipped to Mineral Point, to Waukegan, and sometimes to St. Louis, for the manufacture of zinc white.

The ores occur in strata over the Trenton limestone, the blende in most instances in a horizon above the Trenton limestone and resting above a shale containing oil. The blende at and below the water level is mingled with pyrites, which is of the variety known as marcasite.

The first efforts to deal with these complex ores, containing as they do blende, pyrites and some galena, were to disintegrate the blende by roasting in heaps, and after cooling separating the galenabgy jiggling. The losses by fusion and matting were very large and the method was discarded.

Professor Blake, for the Wisconsin Lead & Zinc Company of Shullsburg, Wis., undertook to solve the question of dealing with the waste product of the present system of cobbing and jiggling. The complex ore is first crushed and concentrated, producing raw concentrates, which contain 2 to 3 per cent. of lead, the balance being about one-half blende and one-half pyrites. These raw concentrates are roasted in a roasting furnace specially designed by him. The mass swells considerably in roasting, and is then, after cooling, jigged, the lead and the blende being separated. The roasted pyrites is magnetic, so that magnetic separation could be employed were it not for the fact that the lead remains with the blende.

The Blake furnace is a modification of the Bunton furnace. It consists of a circular floor, 16 feet in diameter, arranged

in a series of annular terraces, the floor being covered by balls in a circular track. The ore is introduced through a hole in the crown of the roof. Each annular terrace is controlled by two plows, reaching from the roof, placed at an angle of 45°. Mr. Blake introduces, as an important feature, superheated air through ports on either side of the main fire place flue, the air being superheated in checker work.

The ore produced by this process is marketable blende carrying 62 per cent. of zinc, less than 1 per cent. of lead and less than 3 per cent. of iron. The capacity of the furnace ranges from 10 to 20 tons per day, according to the size of the particles of ore.

Auguste J. Rossi of New York presented a paper on

Titaniferous Ores in the Blast Furnace.

In taking up the question of the working of titaniferous iron ores in the blast furnace, Mr. Rossi became acquainted with the fact that 50 years since this class of ore had been successfully used in the Adirondacks, James McNaughton of Troy having furnished documents showing that his grandfather, M. McIntyre, and his associates, A. Robertson and David Henderson, operated a furnace about 1840, 32 feet high, 5 foot bosh. The furnace was remodeled in 1848, its lines being changed. In 1852 and 1853 they built a larger furnace, of a capacity of 12 to 15 tons daily, at a cost of \$60,000. It stands still. Mr. Rossi gives drawings of this plant.

The blowing cylinders are still in place, and in a good state of preservation, as well as the hot-blast ovens. The furnace had three tuyeres of a diameter of 4 inches inside at the nozzle and 5 inches at the widest part. They project 6 inches in the furnace, and have a water circulation. Two of them are still in place in the furnace. Through the opening of the third we were able to get inside. The downcomer had a diameter of 15 inches inside, the belly pipe was close to the ground or just below, passing around the furnace through the arches to deliver the blast to each tuyere on three sides. The furnace had a tymp and damp plate with water circulation, and consequently was an open-front furnace. We saw on the ground a duplicate tymp plate which had not been used. The arrangements of the blast ovens are still in order, the downcomer, from the ovens down to the ground, being in place and almost as good as new. The roof of the building has evidently saved the blowing machinery, as it has resisted so far the influence of the weather, but the roof and trestle works of the stock houses and cast house have fallen in.

The lining of the hearth is 18 inches thick, and made, as well as the bottom itself, of large siliceous stone slabs. The blowing cylinders are double-acting, with 10 x 20 inch flap valves. Their inside dimensions are 3 feet 8 inches in diameter, with a 6-foot stroke, corresponding to a capacity of about 63 cubic feet per stroke, or 126 per revolution. At 16 revolutions of the water wheel which furnished the motive power corresponding with the gearing to 40 revolutions on the crank shaft (from actual measurements), this would correspond for each cylinder to $126 \times 40 = 5040$ cubic feet per minute, as the superintendent, Mr. Thompson, stated it in 1854. The cylinders are connected two by two, with the possibility of using 1, 2, 3, or all four, according to circumstances. Above them and connecting with each of them by means of proper valves, is the galvanized sheet-iron receiver, 4 feet 8 inches in diameter and 24 feet long.

Many thousand tons of pig iron were made, and samples of it are in my possession. The monthly statements of pig iron and bar iron shipped to sundry parties, and the letters referring to steel made and sold, give evidence that these works were in full operation at that time, and that a large quantity of iron was made exclusively from ores containing from 10.71 to 20, or an average of about 18 to 20.02 per cent. of TiO_2 .

Had the working of the small furnace first put up been subject to insurmountable troubles from accretions of titanium deposits, it would not have been remodeled, and still less would a larger furnace have been erected at a cost of \$60,000 (blowing apparatus, &c., included). Moreover, the state in which the last furnace was left can be ascertained by inspection. I visited it last September with other parties. We were able to get inside and inspect the lining almost to the very foundations of the hearth, which we found clear of any obstructions other than *débris* which had fallen in, and such moderate amount of salamander like material as is left at the bottom of the hearth of any furnace blown out after a campaign. I detached specimens from the coating adhering to the bricks at different heights, and can exhibit them to any who are interested. The lining appeared to be uniformly glazed from top to bottom. The nozzles of the tuyeres (still in place) were visible in the furnace. We measured the dimensions of the crucible, depth and width, without any difficulty.

The following analysis of slag picked up on the spot appears to show indeed that they charged, besides limestone, some of the labradorite rock in which the country abounds. The slag contains:

	Per cent.
SiO_2	26.72
TiO_2	25.11
CaO	25.81
Al_2O_3	11.86
FeO	3.46
MgO	5.99
CuO	1.96
Total.....	100.91

These works were stopped toward the end of 1856. Lack of railroad communications, the failure of negotiations (at one time reported to be almost completed) for the sale of the property to parties having adequate capital and the embarrassments accumulated by reason of the financial crisis of 1857, &c., caused the abandonment of the enterprise. The fuel used in these furnaces was charcoal, abundantly supplied by the wooded hills of the property, which covers about 100,000 acres. I have mentioned the attempted sale of the works, because during these transactions the record books of the furnaces were unfortunately transferred to other parties, and no traces of them can be found. Otherwise we should have something more than conjectures to offer as to the process they followed.

The objections made, on general principles, to the use of these ores, as far as we have been able to ascertain, can be summed up as follows:

1. The accretions of nitro-cyanide of titanium in the furnace hearth at the bottom or on its sides (on this point opinions differ) or on the lining as hangings.
2. The reputed refractory character of the ores, involving a higher temperature in the furnace and an increased consumption of fuel.

3. The want of fluidity of the slags containing titanic acid, generally reported as pasty, often to such a degree as to make tapping impossible.

The poorer ores, such as contain so little as 35 per cent. Fe , while the titanic acid reaches 38 to 40 per cent.; in fact, the ores which were smelted successfully at Norton, England, might fairly be rejected on account of their leanness, as incapable

of being treated with commercial success, at least in this country. But this judgment might be independent of any question of titanic acid; an equal amount of silica taking its place would make the ores unacceptable to any ironmaster here. The "titanic scare" is hardly creditable to American ironmasters. It may be remarked, in passing, that in the successful smelting carried on by Dr. Forbes at Norton, he used lean ores containing 35 to 36 per cent. of Fe and, under these conditions, the consumption of fuel per ton of iron produced could not very well be attributed, at least not solely, to the presence of titanic acid, but rather to the absence of iron.

There are, however, some good reasons for objecting to the use of these ores. Ores high in titanic acid do not mix kindly with other ores, and are certainly inclined to form obstructions in the hearth, under certain conditions. But why should it be so? We know that at a high temperature titanium has a great affinity for nitrogen; in fact, its combination with this gas is attended with evolution of heat and light, a nitride of titanium being the result. Moreover, in the presence of carbon and nitrogen, at high temperatures, titanium produces nitro cyanide of titanium, a substance of bright copper color and quite infusible. If the temperature is very high in a furnace, as is the case when the higher grades of pig iron are produced, titanic acid, like silicon, has a tendency to be reduced to the metallic state; but, unlike silicon, it does not pass readily into the iron (at least not to any great extent in most cases), and carbon, nitrogen, and a high temperature, all the conditions required for the formation of the nitro cyanide being present, the latter is produced. These considerations may explain how from ores, containing but a comparatively small amount of titanic acid, or from more highly titaniferous ores smelted in admixture in small quantities and for the highest foundry grades, titanic acid may be thus reduced. The silica having saturated all the affinities of the bases, the titanic acid becomes practically an inert element, washed out from the furnace, so to speak, with the slag, if its amount is decidedly very small (in which case no special trouble can result from its presence), or liable, if present in more important quantities, to be partially decomposed at such high temperatures before it leaves the furnace and then to enter as titanium into infusible combinations with nitrogen and carbon.

But at lower furnace temperature, as, for instance, when the furnace is running for light gray, mottled or even white iron (grades which contain but small quantities of silicon), would not the titanic acid be less liable to reduction?

TITANATE SLAGS.

If, on the other hand, the furnace charges were so proportioned that the titanic acid were made an essential element of the slag, if present in large quantities; if its affinity for the bases (as we shall see) were satisfied; if it were engaged in an actual combination with them, would not the tendency be to prevent the reduction mentioned? If this reasoning be well founded, it is clear that there would be an advantage in treating alone in a blast furnace the higher titaniferous ores, in preference to those containing but a small amount of titanium.

But, if the temperature of the furnace is kept comparatively low, why should an excess of coal be required to smelt these ores? And if they are rich in iron at the same time, why should the oxide of iron they contain require more heat to reduce it than that in other ores? These ores, as far as we have been able to ascertain, at least for those of the Adirondack district and others, crack and crumble readily at a

dull red heat, showing fissures, which justify the assumption of a rapid reduction. In fact, this proved to be the case in our limited experiment in a small blast furnace, as will be shown below.

Heated hardly to dull red heat and dipped in water, they crumble to pieces under the smallest shock. I have repeated this experiment with titaniferous ores from Canada, Connecticut, New Jersey, and with fine and coarse grained ores from the Adirondacks, always with the same results; the ores assuming the blue color of blue schorl or anatase (octahedrite), a variety of titanite acid. This method is, indeed, both rapid and easy, to determine at once whether an ore is highly titaniferous (6 to 20 per cent. or more of TiO_2). The experiment may have a negative result, even if titanite acid be present; but in this case the quantity of that substance is not likely to be important.

The above reasoning supposes, of course, that the slags obtained by the combination of titanite acid with the bases (titanite acid being depended upon as the principal acid element for their saturation) would be fusible and liquid. It has been the purpose of my experiments on the compound titanates to obtain such fusibility and fluidity. Keeping the silica out means obviously avoiding the reduction of silica in the furnace, and therefore a comparatively low temperature, a condition which also keeps the titanite acid out and prevents it being reduced. If so, why should these ores be called refractory? If they yield a forge iron and require an acid cinder and a slack blast, these conditions do not involve a very high temperature in the furnace. The iron we obtained in the small furnace which we have erected for the purpose of controlling the results of the experiments made in crucible (of which we will speak further) was mottled, or mottled white, very close grained and tough and strong. It took repeated blows from a sledge hammer to break it, mottled as it was; it forged and flattened under the blows; and, a piece having been heated in a forge to a dull red heat, we were able to flatten it to the thinness of a chisel edge without breaking it. It contained very little graphitic carbon, the analysis showing combined carbon 2.69, graphitic carbon 0.24, titanium 0.07, and traces only of silicon.

Mr. Rossi has experimented in a small furnace at Perth Amboy, obtaining encouraging results so far as the fusibility of titanate slags is concerned, and producing in small quantity pig possessing some certainly remarkable qualities. His paper gives in detail the data relating to these experiments.

The afternoon session opened with the presentation of "Further Notes on the Stadia Telescope," by Prof. R. H. Richards of the Massachusetts Institute of Technology.

One of the most interesting papers of the meeting was that on

The Biwabik Mine,

by U. V. Winchell and John T. Jones of Minneapolis. It was read by the former. The property, which is one of the famous discoveries of the Mesaba range, is owned by the Biwabik Mining Company of Sharon, Pa., the controlling interest being in the hands of P. L. Kimberly, the well-known iron manufacturer, and his friends. It is probably the most thoroughly explored mine on the range, over \$60,000 having been spent in test pitting, shaft sinking, drilling and drifting with the aim chiefly of determining whether it would be more economical to extract the ore by un-

derground mining operations or remove it by open pit work. After a thorough canvass of the situation, the latter method was determined upon. The ore body is about $\frac{1}{2}$ mile in length, $\frac{1}{4}$ mile in width, and has a thickness up to 100 feet. By 23 shafts and pits the form of the body and its position has been thoroughly determined and the character of the ore has been ascertained by elaborate and careful sampling. In the aggregate a groove 1729 feet long has been taken out in sampling the different openings, or 1 foot groove for every 12,000 tons of estimated ore contents. The average of the whole sample representing 1729 feet of groove was 61.65 per cent. of iron and 0.052 per cent. of phosphorus. The average of all the samples above 61 per cent. of iron and below 0.06 of phosphorus was as follows:

	Per cent.
Metallic iron	63.25
Phosphorus	0.036
Silica	2.6
Sesquioxide of iron	90.36
Sesquioxide of magnesia	0.53
Alumina	1.21
Lime	0.13
Magnesia	0.07
Alkalies	0.08
Sulphur	0.002
Phosphoric acid	0.08
Volatile and organic matter	4.20
Total	299.33

The cubical contents of the ore body have been figured at 247,155,000 cubic feet, which, if there are no losses, of which there is no indication as the result of the test pitting thus far, should yield over 20,000,000 tons of ore. The quantities available of different grades, according to the analyses and the explanations, figure out as follows:

Grade.	Iron.	Phosphorus.	Tonnage.
No. 1.....	66.04	0.026	5,074,512
No. 2.....	63.86	0.033	2,811,232
No. 3.....	63.94	0.059	893,000
No. 4.....	62.08	0.040	3,251,976
No. 5.....	61.60	0.075	4,026,256
No. 6.....	54.59	0.082	4,530,572
Averages and total.	61.65	0.052	20,595,948

This enormous body may be laid bare by stripping off a cover of 2,893,333 cubic yards, a work which is now progressing. Mr. Winchell showed a series of maps and sections of the deposit, and outlined the plan for the stripping and the removal of the ore with steam shovels. The work will be done with 12 tracks, six each of the two roads, the tracks having a grade of only $1\frac{1}{2}$ to 2 per cent. While no statement of the cost of this work was made, it is reported that the estimates of the cost of removing the ore place it at 16 cents per ton.

DISCUSSION.

In the course of the discussion, which really consisted of only a brief cross-examination to which Mr. Winchell was subjected, he stated that probably during their shipping season the Mesaba range will not forward more than 500,000 tons of ore, that figure being regarded as a maximum, although contracts to pay royalties on shipments have been entered for more than double that quantity. Mr. Winchell expresses the belief that developments up to date have not yet brought to light the ore deposits of the range, and that there are still brilliant opportunities for the investment of capital.

In the evening the visitors and their ladies bundled themselves into a number of large sleighs, two parties being formed, one visiting the house of the Montreal Snow Shoe Club and the other going to the St. George Club. At the former the

arrival was so timed that it coincided with the finish of a race on snow shoes. The evening was pleasantly spent with recitations, songs, dancing, and speech making, the American orators being rewarded by undergoing the sacred rite of bouncing.

THE THURSDAY SESSION

began with the reading of a paper by Prof. R. H. Richards on "A Graphical Slag Calculation," followed by the brief note by E. E. Russell Tratman of New York, on

Unfreezable Dynamite.

The use of dynamite in cold weather is attended with some difficulty, owing to the freezing of the material and its consequent liability to fail to explode when the fuse is fired. With proper methods and care the dynamite can be thawed with reasonable safety, but numerous accidents occur (more than get reported in the public press), due to carelessness in the operation and to the treacherous nature of the material, or a combination of both conditions. Dynamite will stand treatment at one time which at another time will result in explosion. An expert on explosives says that the most dangerous means of thawing cartridges are ingeniously devised by ignorant laborers; baking, boiling and toasting being favorite methods, while at a stone quarry, in one instance, an apparatus was arranged for steaming the cartridges over a pot of boiling water. In this latter case the nitroglycerine leaked through the canvas cover and settled on the bottom of the pot, with the result that an explosion occurred, the water acting as a tamping to the charge.

The fact that small quantities of explosives containing nitro-glycerine will burn quietly and without explosion if ignited by direct contact with a flame has led to the dangerously mistaken reasoning that merely heating the explosive can produce no ill effect. If a dynamite cartridge is ignited or placed in a fire it will probably burn harmlessly away, but if placed on a stove or in an oven and gradually heated to its exploding temperature of 350° to 400° F. a violent explosion is almost certain to result, while before that point is reached the dynamite will become extremely sensitive to shock.

In England alone, from the beginning of 1872 to the beginning of 1890, there were reported 63 accidents due to improper thawing of dynamite, by which 50 lives were lost and 76 persons injured. Reference may here be made to the explosion of dynamite, December 28, 1892, in a thawing apparatus at the works for commencing the Brooklyn end of the proposed New York and Brooklyn tunnel, by which four persons were killed and about 20 injured. According to report the thawing was done by placing the cartridges on shelves in a chamber 6 feet square and 8 feet high, heated by a coil of steam pipes.

An unfreezable dynamite, invented by Liebert, a German, has been used to some extent in Europe, and has been favorably reported on by chemists and experts in explosives, and it would appear most advisable to test its practical efficiency in this country. The dynamite is made in the usual way, but its composition includes a chemical by which its freezing point is lowered from 40° above to 50° below 0, F., while the explosive power is slightly increased and the sensitiveness to concussion slightly decreased. This dynamite, it is claimed, is not affected by damp; it may be kept for considerable time without deteriorating or losing its special properties, and its cost is little, if at all, in excess of that of ordinary dynamite. It is patented in the United States.

The substance of a somewhat lengthy discussion which followed was that slow thawing was the best method to prevent accidents.

H. B. Small of Ottawa contributed a paper entitled "The Phosphate Mines of Canada." The section inclosed by the Gatineau and the Lievre rivers, tributaries of the Ottawa River, together with a belt four or five miles wide on the east and west, constitutes the phosphate country. From 1878 to 1891, inclusive, there were exported from Canada 267,729 tons of phosphate, valued at \$4,483,746, the maximum thus far being reached in 1889, when 29,987 tons were shipped. In 1891 the quantity was only 15,153 tons, valued at \$119,532.

Election of Officers.

The tellers then announced the following as the result of the annual election of the Institute.

President, Henry M. Howe of Boston.

Vice-Presidents, A. J. Bowie, Jr., of San Francisco; Robert G. Leckie of Londonderry, N. S., and E. G. Spilsbury of the Trenton Iron Company, Trenton, N. J.

Managers, H. H. Campbell, Pennsylvania Steel Company, Steelton, Pa.; W. L. Sheaffer, Pottsville, Pa., and A. M. Shook, the well-known Southern iron master of Tracy City, Tenn.

Treasurer, Theodore D. Rand, Philadelphia.

Secretary, Rossiter W. Raymond, New York.

The new president was escorted to the chair by two past presidents, R. H. Richards and T. Egleston.

Among the papers read by title were the following:

"Notes on the Geology of the Half Moon Mine, Pioche, Nev.," by E. Wiltse, San Francisco.

"Note on Anthracite Coal Apples from Pennsylvania," by W. S. Gresley, Erie, Pa.

"The Use of Producer Gas for Drying and Roasting Ore at the Lixiviation Mill of the Holden Smelting & Milling Company, Aspen, Col.," by W. S. Moyse.

"An Investigation of Coals for Making Coke in the Semi-Solvay Ovens, with the Recovery of Ammonia and Tar, and Remarks on the Sources of Ammonia," by J. D. Pennock, Syracuse, N. Y.

"The Mineral Resources of Southeast Alaska," by G. W. Garside, Juneau City, Alaska.

"Notes on Emmerton's Method for the Determination of Phosphorus," by H. C. Babbitt, Thurlow, Pa.

"A Variable Speed Pulley," by H. C. Spaulding, Exeter, N. H.

"The Reduction Works of the Mount Stewart Lead & Silver Mining Company, Leadville, New South Wales," by F. M. Draker, Sydney, New South Wales.

"The Bendigo Gold Field," by T. A. Bickard, Denver, Col.

"Notes on the Lease or Tribute System of Mining as Practiced in Colorado," by B. B. Lawrence, Denver, Col.

The afternoon was given to the

First Joint Session

of the American Institute of Mining Engineers, the General Mining Association of the Province of Quebec and the Mining Society of Nova Scotia, the opening paper being that of A. Blue, Director of Mines

at Toronto, entitled, "Notes on the Mining Law of Ontario," in which the development of the mining laws of the sister provinces was dealt with. This was followed by a paper by H. S. Poole of Stellarton, Nova Scotia, on the "Legislation Affecting the Working and Regulation of Mining in Nova Scotia," the discussion of both contributions taking the turn that the expediency of demanding a royalty on mineral produce on the part of the government was debated almost exclusively. The rest of the afternoon was devoted to two papers, one by Charles Fergie of Westville, Nova Scotia, on "The Drummond Colliery" and the other by Dr. R. Wells of Ottawa, on "The Apatite Deposits of the Ottawa District."

A good many of the visiting engineers shirked their duty as attendants at the meeting to enjoy the novel delight of tobogganing.

The Second Joint Session

took place in the evening, Captain R. C. Adams being in the chair. J. McEvoy of the Canadian Geological Survey, Ottawa, presented an account of "Hydraulic Mining in British Columbia," followed by J. Burley Smith of Glen Almond, on "Apatite Mining in Quebec," and W. T. Gibbs of Buckingham on "The Electrolytic Extraction of Metals from their Ores." The session was closed with an account, by Captain Adams, of a visit to the West Kootenay country.

Some of the engineers availed themselves of an opportunity of witnessing a game of hockey at the Crystal Skating Rink, their report indicating that it is an extremely lively and exciting sport. Others amused themselves by going to a carnival at an open-air skating rink.

Friday morning proved to be the gala day of McGill University, the occasion being the

Opening Ceremonies of the Engineering and Physics Buildings.

Thomas Workman and U. C. McDonald of Montreal donated the funds for the erection of two magnificent buildings, with their equipment of tools, machinery and instruments, which will allow of the teaching of thorough courses in Applied Science. The Engineering Building contains on the ground floor a testing, a hydraulic, a geodetic and a thermo-dynamic laboratory and a dynamo room. The first floor is utilized for a cement testing room and an electrical laboratory, while the second floor has a magnetic and a mathematical laboratory, instrument rooms and library, there being lecture rooms on both these floors. The third floor is given over entirely to drawing rooms, while above it is the engineering museum.

In another, the Workshops Building, there are boiler and engine rooms, machine shops, a forge, a foundry, wood-working and pattern-making departments and carpenter shop.

The Physics Building, a noble structure, has laboratories for scientific research and has a fine lecture theater.

The opening ceremonies consisted of a somewhat protracted series of addresses in

which a large number of Canadian dignitaries took part, the American visitors being represented by H. M. Howe, John Birkinbine, Chas. Macdonald and Dr. R. W. Raymond, who made brief but happy speeches.

In the afternoon the Physics Building was the scene of formal proceedings, the majority of the members utilizing the opportunity of sleighing on the St. Lawrence River and of watching a curling match.

In the evening a carnival took place at the Victoria Skating Rink, the graceful movements of some of the skaters commanding the attention of the majority until the hour had come to participate in a crowded reception at McGill University by the Governor-General Lord Stanley of Preston.

The early morning found the party ready to start on a highly interesting excursion to visit the property and plants of

The Canada Iron Furnace Company.

at Radnor Forges, Grandes Piles Loc à la Tortue, Quebec. From a charming and beautiful souvenir prepared by George E. Drummond, managing director of the company, which contains also papers by P. H. Griffen of Buffalo, president of the company; by A. P. Lowe of the Geological Survey of Canada, and by J. T. Donald, professor of chemistry of Bishop's College, Montreal, we take the following data concerning the enterprise and the plant:

The peculiar virtues of the Three Rivers iron have long been known to the Canadian people. Two hundred and twenty-five years ago, in the very earliest days of La Nouvelle France, specimens of the bog ore of the St. Maurice District were examined in Quebec by the Sieur la Pontardiere, and reports sent to the Imperial Government in France. At that time the affairs of the colony were under the control of the "West India Company," who held monopoly of all the rights of the mines and minerals of La Nouvelle France, including those now owned by the Canada Iron Furnace Company.

Among the original manuscripts relating to the administration of Louis de Buade, Comte de Frontenac, allusion is frequently, in 1672, made to the great value of the St. Maurice iron mines.

In 1675 the charter of the West India Company was surrendered, and the next official notice of the mines that appears was the issue of a deed in August, 1676, in favor of Dame Jeanne Jalope, widow of Maurice Poulin, Sieur de la Fontaine, the King's Attorney for Three Rivers, who, by the said deed, obtained concession of the Seigneurie of St. Maurice. This lady appears in turn to have deeded the property to her son, Michel Poulin, in 1683.

The Poulin family seem to have controlled the ore rights and lands, at least in part, until as late as 1736, as existing documents show that on October 15, 1736, Poulin, Louise de Boulanger, his wife, and Michel, his brother, a priest, sold the fief and seigneurie St. Maurice to François Etienne Cugnet, Pierre François Tascheau, Oliver de Vezain, Jacques Simonet and Ignace Gamelin for the sum of 6000 livres with no terms, so long as they paid 300 livres a year.

The partnership so formed was known under the title of Cugnet & Cie, or La Compagnie des Forges, and the King of France (at that time Louis XV) by an order in Council dated April, 1737, empowered them to establish iron works, and advanced them the sum of 100,000 livres, claiming neither rent nor taxes. The firm under these conditions proceeded to erect

a blast furnace (the historical St. Maurice), which remains to this day, and over the arch of which can yet be seen on an iron plate the insignia of France, the Fleur de Lys, together with the date 1752. Work was practically commenced under the direction of a French artisan, but lack of capital led to failure, and finally, in 1743, the Crown took possession of the furnace and proceeded to carry on the work in the name of the King and on his account. Skilled workmen were brought over from France and Sweden to improve the furnace, rebuilding it in part at least (about 1752), and producing the blast furnace as it now stands with Walloon hearth, in use until as late as the summer of 1883.

Among the most interesting of records relating to the iron interests of the St. Maurice district is a letter written in August, 1747, by Prof. Peter Kalm, professor of economy in the University of Aoba, in Swedish Finland, and a member of the Swedish Royal Academy of Sciences. Professor Kalm visited Three Rivers (in his travels through the country), seemingly for the special purpose of visiting the iron works. He wrote as follows:

This iron works was first founded in 1737 by private persons, who afterward ceded it to the King; they cast cannons and mortars here of different sizes, iron stoves which are in use all over Canada, kettles, &c., not to mention the bars which are made here. They have likewise tried to make steel, but cannot bring it to any great perfection, because they are unacquainted with the best manner of preparing it. Here are many officers and overseers, who have very good houses built on purpose for them. It is agreed on all hands that the revenues of the iron works do not pay the expenses which the King must every year be at in maintaining it. They lay the fault on the bad state of population, and say that the few inhabitants in the country have enough to do with agriculture, and that it, therefore, costs great trouble and large sums to get a sufficient number of workmen. But, however plausible this may appear, yet it is surprising that the King should be a loser in the carrying on of this work, for the ore is easily broken, very near the iron works and very fusible. The iron is good and can be very conveniently dispersed over the country. This is, moreover, the only iron works in the country, from which everybody must supply himself with iron tools, and what other iron he wants. But the officers and servants belonging to the iron works appear to be in very affluent circumstances. A river runs down from the iron works into the river St. Lawrence by which all the iron can be sent in boats through the country at a low rate.

There seems to be no doubt but that the suspicions shadowed forth in Professor Kalm's letter, regarding what we might in the nineteenth century term the "boodling" of the Government, the Intendant, and the principal officials were perfectly correct, as documents relating to that time show that many complaints were dispatched to France touching on the ruinous state of affairs being produced by the officials of the Province, and these complaints resulted in the Governor, the Marquis de la Jonquiere, being recalled and Inspector M. Franquet was sent out to visit the different posts in La Nouvelle France.

The next official notice of the forges is perhaps its mention in the articles of capitulation between Major-General Amherst, Commander-in-Chief of his Britannic Majesty's troops in North America, on the one part, and the Marquis de Vaudreuil, Governor for the King in Canada on the other side. These articles were dated September 8, 1760. Article 44 says:

The papers of the Intendancy of the officers of Comptroller of the Marine, of the ancient and new treasures of the King's magazines, of the officers of the revenue and forges of St. Maurice shall remain in the power of M. Bigot, the Intendant, and shall be embarked for France in the same vessel with him; these papers shall not be examined.

M. Bigot sailed for France, and on his arrival there received more than a warm welcome, being seized, imprisoned and made to disgorge most of his ill-gotten gains (*vide* Parkman's *Montcalm* and

Wolfe). St. Maurice forges, with all accessories, then passed into the hands of the British Crown, and belonged thereto until as late as 1846.

Among other matters of historical interest, connected with the St. Maurice forges, may be mentioned the fact that, in 1775, during the American invasion, Pellissier, one of the lessees of the forges, aided and abetted the Americans with both goods and money, and further, he actually cast shot and shell, to be used by them in their siege of Quebec. Finally he absconded by way of Sorel to the United States, carrying with him all the funds belonging to the forges, and also all the vouchers given for money advanced to the Americans, about £2000 in all. His American friends seemed to have cashed these vouchers, after which he sailed for France, leaving his co-directors in the company then operating the forges practically insolvent. The works passed by lease from the Government, through various hands, until in 1793 the lease became vested in Messrs. George Davidson, David Munro and Matthew Bell. The Hon. Matthew Bell, Seigneur of St. Maurice, seems to have had "friends at Court," as he was able to renew the lease with the Government authorities from time to time, down to 1846. During his *regime* the St. Maurice forges were known far and wide throughout the country, not alone as an iron-producing center of first importance to the colony, but also for the princely hospitality extended to all visitors by the Seigneur and master.

At this time the iron industry was the most important of all the enterprises of Canada. Hugh Gray, in "Letters from Canada, 1809," page 22, writes: "There existing then a considerable export of cast-iron articles, principally of stoves."

The trade of the St. Maurice forges seems to have been very great during Mr. Bell's time. He had, in addition to the furnace, extensive forges, foundries and workshops. The number of men employed were from 250 to 300, the superintendents being mostly English and Scotch and the workmen generally Canadians. Stoves were the principal articles manufactured, and these were sent broadcast over the country; indeed, many specimens of these stoves remain till this day and demonstrate the splendid quality of the iron used in their manufacture. Mill machinery, potash kettles and other articles were manufactured in large numbers—and in addition to this, bar iron was manufactured and even exported. The inhabitants of the country recall with wonder, even to this day, the princely magnificence in which the Hon. Matthew Bell lived during his *regime* at the St. Maurice forges. He kept open house at his chateau, and entertained, at various times, the Governor and British officers, besides other dignitaries. He kept a stud of horses and a pack of fox hounds, and as the district of St. Maurice has always been famous for the abundance of fish and game to be had, there was no lack of attraction for sportsmen. On the death of the Hon. Mr. Bell the Crown resolved to sell the property, and it was bought at auction by Henry Stuart, advocate, of Montreal, in August, 1846, and was leased by him to James Ferrier (afterward Senator Ferrier), who worked it successfully for four years, viz., from 1847 to 1851. Later on the forges passed through the hands of Messrs. Stuart and Porter of Quebec, and finally to the Messrs. McDougall of Three Rivers, who operated the furnace until as late as the summer of 1883, using the iron thus produced in the manufacture of railway car wheels, with the very best of results, as far as the quality of the product is concerned.

About the year 1860 Larue & Co. (the firm consisting of Larue, Turcotte and G. B. Hall & Co., after a very careful inves-

tigation, made with a view to locating the best point in the St. Maurice district for the erection of a blast furnace, &c., decided upon the site of the present Radnor Forges in the County of Champlain, thus strangely enough transferring the chief iron industry of the district of St. Maurice to the very site foreshadowed by Louis de Buade, Comte de Frontenac, as far back as 1672, as the most desirable location in all that country for the erection of a blast furnace.

Larue & Co. carried out what, for that time, was a most elaborate plan, and established not only the blast furnace, but forges, rolling mills and car wheel foundry (the latter located at Three Rivers). In addition to this they had 40,000 acres of freehold lands. From 200 to 400 men were employed, and the works were carried on for some time with a product of 4 tons of pig iron per day. A pair of car wheels together with an axle manufactured at these works were sent by Messrs. Larue & Co. to the International Exhibition of 1862, and attracted much attention, as the wheels had actually run 150,000 miles.

The wrought iron produced at the establishment was used largely for the manufacture of scythes and nail-rod iron, and was much prized by consumers, who considered it equal if not superior to the very best Swedish iron.

In the establishment of the works over \$1,000,000 was sunk, and the greater part of it was lost through disastrous fires, and, it is said, "bad management." There is no doubt, however, that the lack of railway facilities, which prevented supplies being taken from a greater radius than 7 miles, handicapped the proprietors in their attempt to find a market for the product, and had as much to do with the failure as anything else.

The Canada Iron Furnace Company, Limited, were formed in 1889 for the purpose of acquiring the iron interests of the district of St. Maurice, including iron works at Radnor Forges, together with all accessories, such as a village of 60 workmen's cottages, limestone quarry, perfected water power, clay pits, railway line, bridges, sidings, and other valuable property; also car wheel shop, and shipping dock situated on the River St. Lawrence at Three Rivers, Quebec, property forming site for permanent battery of charcoal kilns, together with water power on the River St. Maurice, at Grandes Piles, Quebec; ore deposits of Lac-a-la-Tortue, together with ore rights, over 100,000 acres of ore-bearing lands and lakes at other points in the district of St. Maurice and vicinity.

After operating the antiquated stone stack at Radnor Forges (capacity 4½ tons per day) for some two years, in an experimental way, the company proceeded to develop the entire property, systematizing the collection of ore and wood, by establishing ore depots, wood camps, charcoal kilns, &c., at the most desirable points throughout the territory controlled by them, and finally building at Radnor a modern blast furnace plant, complete in all necessary details, and capable of producing every day from 40 to 50 tons of high-class charcoal iron.

The furnace is situated in the very center of the ore fields, and in close touch with the wood limits, not only of the St. Maurice, but of the vast territory extending to the north and south of the river, which is, as yet, primeval forest.

The Riviere-au-Lard, on the bank of which the furnace stands, affords an excellent water power for operating ore and stone crushers, for pumping water to the furnace belt, for fire protection, and other necessary purposes. The waste gases of the furnace are utilized for fuel, and the plant itself operated therewith. The immediate plant consists of the following:

The furnace stack has a height of 40 feet; bosh, 9 feet diameter; crucible, 5 feet diameter; height of bosh line from hearth, 13 feet; four tuyeres of $3\frac{1}{2}$ inches diameter. Crucible and bosh from mantel ring down is incased and protected with a Russel Wheel & Foundry Company water jacket. The hot-blast stove is of the pipe pattern, with a combustion chamber below. The dimensions are: Length, 24 feet; height, 18 feet; width, 9 feet 6 inches; 68 openings between combustion chamber and pipe chamber above. The steam power consists of four steam boilers, each 4 feet diameter by 25 feet long, with two 18 inch flues; shells are of $\frac{3}{4}$ -inch plate and double riveted. All boilers connected with a brick chimney 75 feet high, and all are bricked separately, and arranged to fire with either wood or gas. Gas connections are made so that boilers can be worked in batteries of two each or more, and one or two can be laid off for repairs or cleaning at any time. The water power consists of a head of 24 feet, with a New America wheel 35 inches in diameter, capable of delivering 65 horse-power. The Weimer blowing engine, size 16 x 48 x 30, is set upon a solid stone foundation, which rests on a limestone bottom. This engine is provided with a patent water heater and a Scanlan patent wind receiver and heater, capable of raising the temperature of wind to about 200° F. before entering the hot-blast stove. The auxiliary blowing engines are of the horizontal type, with two cylinders, each 40-inch diameter by 46-inch stroke, and are geared to be driven either by a horizontal steam engine of 14 x 20-inch cylinder, or by water power. These engines are complete with their own wind receiver and pipes, and are so arranged that they can be used in case of an accident to or a shutdown of the Weimer engine. They deliver about 2100 cubic feet of air per minute, with a pressure of $4\frac{1}{2}$ pounds. The whole is set up in an engine house entirely separate from the Weimer, and is isolated from the latter and the boiler house.

The hoist is a Crane double-cylinder hoisting engine; size of cylinders, 8 x 10 inch. This engine is connected with two hoisting cages, having a lift of 15 feet from floor of weigh house to floor of top house.

The Radnor forges battery of charcoal kilns consists of: 8 rectangular kilns, capacity, 55 cords each; 3 beehive pattern kilns, capacity, 55 cords each; while the Grandes Piles battery consists of: 14 beehive pattern kilns, capacity, 55 cords each. Others are in course of construction. Charcoal is also made and supplied from pits in the Swedish manner.

The main kilns, located on the company's property at Grandes Piles, can draw supplies from the banks of the St. Maurice for half a century to come. The location of these kilns secures to the company the practical control of the navigable waters of the St. Maurice, Grandes Piles being the terminus not only of the railroad, but also of navigation. The Laurentian range of mountains presents a barrier to the rail way going further north, while the succession of magnificent waterfalls and rapids between Grandes Piles and Three Rivers absolutely prevents the navigation of the St. Maurice to the south. This property also gives the company control of the Grandes Piles Falls, which with a drop of 40 feet has a volume of water representing a power not less than 35,000 horse-power.

The vast territory to the north, watered by the St. Maurice and its tributaries and estimated as 200,000 square miles, contains an immense quantity of pine and spruce, and at the present time its limits are attracting the attention of American capitalists, as evidenced by the fact that the American Laurentides Pulp Company have already expended hundreds of thousands of dollars in the erection of a pulp mill and in perfecting the water power at

Grande Mère, a few miles below Grandes Piles.

The work of bringing the furnace plant and accessories to its present condition has been no easy task. American furnace-men, the majority of whom are able to purchase their raw material, such as ore and charcoal, in the open market, will appreciate the difficulties of establishing a new furnace in what may be termed "The Wilderness." The Canadian furnaceman has, so to speak, "to live within himself," to provide workmen for his entire cut of wood, to transport same to his charcoal kilns, and the charcoal to the furnace. He has also to "mine" his full supply of ore and other necessary material. All this the officials of the Canada Iron Furnace Company have had to do, and the greater part of the reorganization and systematizing has been carried out within the space of one year, and that too concurrently with the construction of the plant itself.

Among the serious difficulties the company have had to contend with was the fact that owing to stagnation in the lumber interests of the St. Maurice district, there was at the time of the inauguration of the company a great scarcity of labor, the workmen having left the country in large numbers. Further, the officials had to contend with great difficulties in their attempt to change the weights and measures that had been in vogue in this territory for many years; for instance, the habitants at first positively refused to supply wood of a greater length than 3 feet, and the company desiring to be in the same position as their American competitors, had to set to work to change this to the present standard of 4 feet, in the face of considerable opposition from the habitants. These alterations have been carried out without undue friction, and the American standard is now used in all departments.

In carrying out all the operations of the company, upward of 800 men are directly and indirectly employed during the season, the majority of whom are engaged in the securing of ore and wood supplies. Through proper systematizing the company's employees are now taken largely from the ranks of the farmers or habitants, who work for the company during their slack season between seed time and harvest, and in the winter months. These men find the work profitable in clearing their lands by supplying wood to the charcoal kilns, and in raising ore on portions of their farms which would otherwise be unproductive. In this way the work of the company goes on almost continually over a very large territory, and the supplies of both labor and material so obtained are, therefore, now practically unlimited.

P. H. Griffin, in the paper referred to, says:

Some years ago we were induced to test in our car-wheel shops at Lachine and St. Thomas a quantity of Canadian charcoal iron, the product of an antiquated stone stack situated at the village of Ferment, or Radnor Forges, Champlain County, Quebec. We were told this iron was made from the bog and lake ores of the Three Rivers district, celebrated in the history of the Canadian iron industry, and that it had peculiar merits in strengthening mixtures for car wheels and other high-class castings. At that time we were using largely Selected Salisbury charcoal iron imported at a very heavy cost from the United States. We were loth to make any change in our mixtures, as we had always pursued a most conservative course in the selection of iron entering into our wheels, but we finally decided to enter upon a series of careful tests with Three Rivers Canadian iron. Several trials proved that it was an iron of undoubted merit, which if the ore and wood supplies of the district warranted, could

and should be made in large quantities, not alone to the advantage of the parties operating the furnace, but to the advantage of every consumer of iron in Canada who required castings of special quality, and certainly to the great gain of the province and Dominion. We found the iron soft, tough, clean, close in texture and with fine chilling qualities—the higher grades admirably adapted for the manufacture of chilled car wheels, the medium grades for castings requiring great strength, and the lower grades soft enough for the finest stove work. To give some idea of the strength shown in these tests we give the following result of the experiments made by us:

The basis of strength on first-class standard car-wheel mixtures is expressed by a strength of 50,000 pounds per square inch transverse strength, obtained from a bar 1 inch x 12 inch, the bar being supported on the extreme ends. By the introduction of 33 per cent. of Three Rivers iron into our car-wheel mixtures we were able to secure a strength of 65,000 pounds without difficulty. It was impossible, however, to procure any considerable or regular supply of the iron, the capacity of the old Radnor furnace being very limited and its operation irregular.

We did not at that time think it possible to develop the manufacture of any great quantity of this special kind of iron, but we did prove to our satisfaction that with proper arrangements a considerable quantity, say 3000 to 5000 tons, could be made annually, with every prospect of the maintenance of this product for many years. Later work has developed the fact that this particular iron can be made in very much larger quantities, probably sufficient for any demand that may be made.

The results obtained from the tests referred to led us to make a thorough investigation with the view of determining the extent of the ore deposits in the Three Rivers district and vicinity, and to find just what dependence could be placed upon the supply of wood for charcoal making. Our investigations were satisfactory, and in August, 1889, we purchased the entire plant and lands of the company. Further investigations were at once commenced in all directions looking to the supply of ore to be depended on, and about one year was spent in prosecuting this work, making leases and purchases to secure the company in their further development. During this period the old furnace was operated with such improvements as could be made upon it, for the purpose of ascertaining further by our own practice the possibilities of the metal. In the meantime arrangements for the supply of ore, wood, &c., had progressed to the point where the erection of a new furnace of large capacity and improved construction could be undertaken. In the early stages of the work it was contemplated to erect a furnace of 20 to 25 tons capacity at Radnor Forges for the manufacture of this special iron, but the possible supply of raw materials proved to be so much larger than anticipated that a larger furnace was decided upon and plans were made for one of 50 tons daily capacity. A furnace giving this product is quite a small affair compared with the great furnaces running on common ores throughout the world, but it must be remembered that the product is of a special class and the development of this particular work was of necessity conducted on moderate lines. As it is, a charcoal furnace running exclusively on bog ores, turning out 50 tons of metal per day, is a thing not to be found elsewhere in the world, if my information on these matters is correct.

All the bog ore used up to our working was taken from the country immediately surrounding the furnaces, not exceeding a range of three or four miles from the center. We find it entirely practical to

take ore over a range of 75 to 100 miles by establishing depots for the accumulation of stocks from which shipments can be made by rail in large quantities. In treating of the source, growth and quantity of bog ore in Quebec it may be stated that the district to which allusion will be made may roughly be said to extend from northeast of Quebec city to west of Ottawa, a distance of, say, 400 miles long by 40 to 60 miles deep. Bog ore is found throughout a much wider range, however. The northern limit of this district is the Laurentian range of mountains, and throughout the whole of this range iron ore seems to exist, generally mixed with the rock. The general formation is such that it favors strongly the natural forces, weather, &c., in the disintegration, and its reduction by attrition. The latter produces principally the fine iron sand found not only along all the river beds, but in fact throughout the entire formation, sand or clay, of this and adjacent counties, and to this attrition, without doubt, the immense iron and sand deposits of Moisie and the lower St. Lawrence are due. Owing to the presence of titanium—which exists more or less in all Laurentian ore—this sand seems to possess the peculiar properties of resisting disintegration by natural decay, to which many other ores seem liable.

Beds of hard bog ore are invariably found on hillsides above which swamps or marshes exist or in runs which lead to or from these swamps. Wherever this dark swamp water flows sluggishly, and especially where swamp moss, fine grass or decayed vegetable matter exist, it will gradually form a light film with every appearance of that caused by oil, which gradually becomes thicker, and sinks to the bottom in some quiet spot, where it takes a yellowish and slightly rusty tinge. This gradually becomes thicker, and when the water becomes lower in the dry summer it becomes denser and either sinks lower to the firmer beds below the grass or hardens and becomes bog ore. One very large deposit of soft ore entirely filled a deep ravine leading from an immense swamp. This ravine was being drained with a view of removing the ore for the purpose of making metallic paint. To all appearance it was simply a dark muck, yet contained on analysis over 45 per cent. of oxide of iron. As the top became dry it caked and broke, the top crust showing as clean, black and brilliant a fracture as the best hard bog ore. This proved that the immense beds of soft ore—known as paint ore—known to exist throughout our swamps, will, when drained from natural or artificial causes, become more perfect, dry up and take the form of hard bog ore beds. Some beds of ore, when the top layer was removed, exposed a heavy bed of soft ore beneath. This being uncovered and exposed to the action of the sun for a time, became so hard that it required heavy work with a pick to remove it. In the particular section alluded to, many of the beds are soft on top and harder beneath, while others are the reverse. This would plainly indicate that in midsummer the water in the small swamps becomes so low that the ore deposited in the runways and during high water when the swamps overflow had time to harden. In some, apparently, the water when again high, overflowed the old hard ore and deposited more ore on top, while in others it found an exit by oozing out beneath and leaving an additional deposit below.

The ground on which bog ore will, or has been formed, applies to all marshes or hillsides between the mountain ranges and the river bottoms into which the water finally finds its way. Much land on which ore is found is to-day comparatively dry, owing to drainage from natural or artificial causes, but a glance at the surrounding country will show that the ground was

once the natural drainway from higher lands. On such places as these the ore is, as a rule, massive and hard.

Once the foundation of a bed of ore is formed it seems to grow more rapidly, partly on account of its affinity or power to draw the iron which is suspended in the water, as the following facts will demonstrate: The Riviere au Lard, from which we obtain our water power, as well as water supply for the furnace, boiler, &c., takes its rise in "Grand Ple," or swamp, in the midst of which lies Lac a-la Tortue. This water at all times is dark and rusty in appearance, and a piece of iron suspended or allowed to lie in its bottom rapidly becomes heavily beaded to the depth of : n eighth to a quarter of an inch with a pure deposit of iron ore, and this without corroding the iron. Besides, ore in this shape will accumulate in all our supply pipes in the same manner, no matter how rapid the flow may be. This at one time was a source of considerable anxiety, but latterly, as the pipes remained longer in use, these deposits appear to attain a certain size and lose their power of adhesion. A blow from the hammer will liberate the heavier and clean the pipe fairly well.

Bog ore, as a rule, is found 12 to 18 inches below the surface. This season, however, we are getting ore at a depth of 4 feet 6 inches, and the beds are heavy, thick and good, apparently of old formation. Ore has been raised from a depth of 8 feet in the "Grand Ple," and although this immense swamp is covered with a soft, floating top, pockets of small-sized ore have been found in paying quantities on the surface. These facts, taken in connection with the deposits of so-called paint ore in this swamp, lead us to anticipate the discovery of large bodies of ore in the bottom, explorations for which we intend to push during the coming season. Excavations to a depth of 10, 12 and 15 feet, in the immediate vicinity of Radnor, show as strong indications of ore at the bottom as at the top.

LAC-A-LA-TORTUE.

This lies in the midst of an immense swamp, "Grand Ple," and to all appearance it is the last remnant of what, at one time, was a lake which included the entire surrounding swamp, but one that probably was never very deep, hence its gradual filling in from natural causes. Besides three small creeks flowing into the lake—very sluggishly—the water oozes in around the shores, which are very low. Soft ore is found throughout the surrounding swamp, and in small patches, on the top of what is apparently a floating beaver meadow, hard ore is found. The entire bottom of the lake is more or less covered with ore, but the richest deposits are immediately opposite or around the mouths of the various creeks. In some places the ore is too heavy for our dredges, and an attack generally only results in broken chains and buckets. The only portion of the lake thoroughly worked in the past is Sturgeon Bay. The principal creek enters this bay. Its extent at the widest part is not over 2000 yards and length about the same. For 30 years this bay has been worked by hand and dredge, and time and again declared to be worked out, and yet this season our dredge hardly stirred from it and made more than double the ore ever taken from it in one season before. This will give some idea of the extreme richness and rapidity with which the ore is formed. It is hardly possible to estimate the quantity of the ore in existence in this lake, as without doubt it is growing steadily. An experiment was made one year ago (1891) in Sturgeon Bay. The dredge frame was allowed to work down into the mud for 6 feet, at which depth it

brought up a fine dark ore, not quite so hard as the surface, and instead of flat cakes, like the latter, it was small and round, similar to gravel in size, but softer, yet as fine an ore in every way. In other parts of the lake heavy massive veins exist several feet thick, and this is the portion which our dredge finds it difficult to work. If necessary, dynamite will have to be used on this. Explorations for ore on the lake shore, where nothing but sand showed on the surface, found heavy cakes over 12 inches below, showing that the old deposits may gradually become covered up.

When we commenced operations we found that, according to popular opinion, even among our best ore workers, and those most conversant with the business generally, there was not sufficient bog ore left in the country to give a constant supply to a 10-ton furnace. Investigation developed the facts that, although furnaces have been working at Batiscan, St. Maurice and L'Islet, &c., since 1737, they had drawn almost their entire supply of ore from the immediate vicinity. In no case did they entirely exhaust the supply, except perhaps within a radius of 3 or 4 miles around the furnaces. Then, again, these furnaces have not been worked steadily, hence steady employment—which alone would produce good explorers—could not be given, and, as a matter of fact, when we commenced operations we did not find a single employee or man who could give us good and reliable information regarding ore fields generally, their knowledge being only of local beds and very superficial.

A. P. Lowe states that the growth of the ore in the lake bottom is quite rapid, it having been found that paying quantities of ore can be obtained from areas completely exhausted some eight or ten years ago.

Work is carried on by hand in the shallow portions along shore, and in the areas left bare by the lowering of the level of the water. The operation consists in shoveling the mud containing the ore into iron sieves about 30 inches in diameter, where the ore is washed free from mud and then made into convenient heaps for removal. In the deeper parts of the lake the ore is raised by a dredge with three rows of iron buckets on an endless chain. This dredge is capable of working to a depth of 12 feet, and brings up the ore mixed with soft mud; this is dumped into a long cylindrical sieve, placed on an incline so as to discharge on to scows moored alongside.

Along the axis of the sieve are arranged a number of jets of water, which as the sieve rotates wash away the mud and allow the clean ore to fall out at the lower end on to the scows. The loaded scows are towed to the west end of the lake where the Piles Branch Railway passes close to the water, and from there loaded cars are run direct to the furnace at Radnor.

During the past season large deposits of massive ore were discovered in the bottom of the lake which are claimed to be 2 feet and upward in thickness, and although work has been carried on here for more than 30 years, the supply of ore last season was much greater than in any former one. The ore was formerly supposed to lie in the mud within a foot or so of the bottom, but this year paying quantities were found in the underlying sands to a depth of 6 feet, the limit to which the dredge would work. From this it will be seen that the supply of ore in Lac-a-la-Tortue is far from exhausted.

On the south side of the St. Lawrence—opposite Three Rivers, in the second, third and fourth ranges of Gentilly—the Canada Iron Furnace Company have discovered and are working a number of remarkably rich beds of ore. These are generally found along the faces of the ter-

racers. The largest bed is about 10 acres long by $\frac{1}{2}$ acre wide. Work here has been carried on to the depth of 4 feet without reaching the bottom of the bed, which will reach 5 or 6 feet in places. The ore on top is fine, but toward the bottom it becomes heavy and massive and has to be broken out by picks.

Medium-sized patches of ore have been found extending over an area of 6 square miles in this locality and no doubt many others will be found in the neighborhood.

Work has also been carried on by this company in the fourth range of Kildare, County of Joliet, where one patch is 3 acres long by $\frac{1}{2}$ acre wide, with an average thickness of 12 inches, all of fine rich ore. There is a band here that is said to have been traced for a distance of 7 miles.

J. T. Donald gives the following analyses:

Composition of Radnor Iron Ore.

	Bog ore.	Lac-a-la-Tortue Lake ore.	
Ferric oxide.....	60.74	70.04	69.64
Ferrous oxide.....			0.72
Manganic oxide.....	1.18	1.78	2.99
Alumina.....	2.50	2.20	2.43
Lime.....	3.47	0.31	
Magnesia.....	0.93	0.27	0.60
Phosphoric anhydride.....	0.69	0.76	0.47
Sulphuric anhydride.....	0.19	0.23	0.09
Silica.....	13.94	7.84	8.17
Loss on ignition.....	16.49	16.84	15.00
Total.....	100.22	100.28	100.11
Metallic iron.....	42.52	49.03	49.31
Phosphorus.....	0.302	0.391	0.205
Sulphur.....	0.078	0.093	0.033

The following is an analysis of Radnor iron to show the nature of the metal in so far as the influence of the ore is concerned:

Analysis of Radnor Iron No. 136.

Iron.....	93.52
Carbon.....	0.701
Graphite.....	3.256
Silicon.....	1.269
Sulphur.....	0.406
Phosphorus.....	0.6332
Manganese.....	0.557
Total.....	99.9968

The furnace is now in blast, a cast being made in the presence of the party. It is now producing about 25 tons, but it is expected that this will be carried up to 40 tons. It occupies the site of the old stack, the removal of which proved to be quite an undertaking. The difficulties overcome by the Messrs. Drummond in placing the operation on a modern basis were fully realized by the engineers when the scope of the enterprise was revealed by their visit. The party returned to Montreal late in the evening, some having enough vigor to accept an invitation to a reception at the splendid home of Sir Donald Smith.

THE WEEK.

There are now 30 steamboats navigating the Upper Congo. This indicates more rapid progress than is made by the American residents of Liberia, where years ago Mr. Scheffelin of New York erected a number of sugar mills. Recently the statement was made that the machinery from one of these mills was used in propelling a boat. The signs are that Liberia is "badly left" by settlers in other parts of the continent.

The fruit trade of New Orleans is increasing rapidly since the railroad lines in that section made a concession in their freight rates to Western points, and the local papers claim that the trade is being diverted from New York.

The Standard Harrow Company has been incorporated at Trenton with an authorized capital of \$2,000,000. The in-

corporators are Edwin H. Risley, of Utica, N. Y.; Maurice Mass, of New York City, and General Oscar E. Madden, of Boston.

Governor McKinley is involved to the extent of about \$100,000 by indorsing for Youngstown manufacturers, but friends come nobly to the rescue.

On January 1 the world's stock of wheat was the largest at any time on record. The aggregate was 237,000,000 bushels; this month it was 234,000,000 bushels, and on January 1 last year was 204,000,000 bushels.

Boomers who are impatient over the delay of Congress in ratifying the treaty for the opening of the Cherokee strip to settlers are preparing to invade that section of the Indian Territory and plant crops for the coming season.

Sincere regret is caused by the announcement of the financial embarrassment of the New York & Brazil Steamship Company. The opposition of tramp steamers, and losses from the interruption of business when the cholera was as virulent in Santos appears to have been at the source of the difficulty. Even the device of chartering foreign-built steamers, which was finally resorted to, was unavailing to avert the impending trouble.

The Canadian Pacific Railway is being extended to secure a winter port at Lewisbourg.

Hard times in Canada are believed to be at the bottom of the agitation for annexation.

Traction lines in cities where electricity is depended on for motive power suffered severely from obstructed tracks during the recent blizzard. The motors often burned out completely.

Governor Flower has concluded not to interfere at present with the sentence of the court in the case of James Hughes, the Master Workman of the Clothing Cutters branches of the Knights of Labor, who is serving a sentence of one year for the crime of extortion, in the Monroe County Penitentiary.

A number of farmers are removing, with their tools and implements, from Illinois to Nebraska and other points in the far West.

Many Canadians argue that a fast freight service from that country to England would be far more beneficial to the interests of the farming class than a fast passenger line heavily subsidized from the Government treasury.

Western men are not at all pleased that in the Senate appropriations in aid of river and harbor improvements between Buffalo and the Soo Canal have been cut down about one-half.

Gas experts have been at work in the Indiana natural gas fields for the purpose of putting the entire belt under one control, buying out all the plants at Crawfordsville, Thornton, Darlington, Lebanon, Muncie, Marion, Kokomo, Elwood, Alexandria and other points where gas is piped, and sending the gas to Cincinnati to be used in manufacturing.

Engineers are proceeding to build jetties and wing dams at Velasco harbor on the Brazos river in Texas, and have closed an important contract.

The reclamation of the land covered by the Zuyder Zee in Holland has been commenced. The dam or sea wall necessary to accomplish this object will be 18 miles long. It will be built through water from 13 to 20 feet deep. The estimated cost of the undertaking is \$95,000,000, which it is expected will be more than repaid by 1,000,000 acres of land which will be recovered.

The Manufactures Building.

(With Supplement.)

An illustration is herewith given of the great Manufactures Building of the World's Fair as it now appears. The view has been taken at the southwest corner. The sheet of water shown is a portion of the lagoon, which communicates with Lake Michigan at the right and extends to the left past the Manufactures Building and thence through the grounds under a succession of ornamental bridges. This is the body of water which will be navigated during the exposition by steam and electric launches, gondolas, &c. The Manufactures Building was completed some time since, and a large force of workmen are now engaged in the erection of booths and pavilions for the numerous exhibitors. Exaggerated accounts have recently been published of damage to the roof of this building by accumulations of snow during the extraordinary winter, which has been especially severe in the Northwest. The framework of the roof has not been injured in the least, as it is so strong that nothing short of an earthquake could affect it. Wet snow sliding from the sides of the great central span fell on the skylights at its base and crushed a few of them in, entailing some work in replacing or repairing them, which will not cost more than a few thousand dollars, and proving more of an annoyance than an expense. The illustration will enable this explanation to be intelligently grasped. This building is the mammoth structure of the exposition, measuring 1687 x 787 feet, and covering nearly 31 acres is the largest exposition building ever constructed.

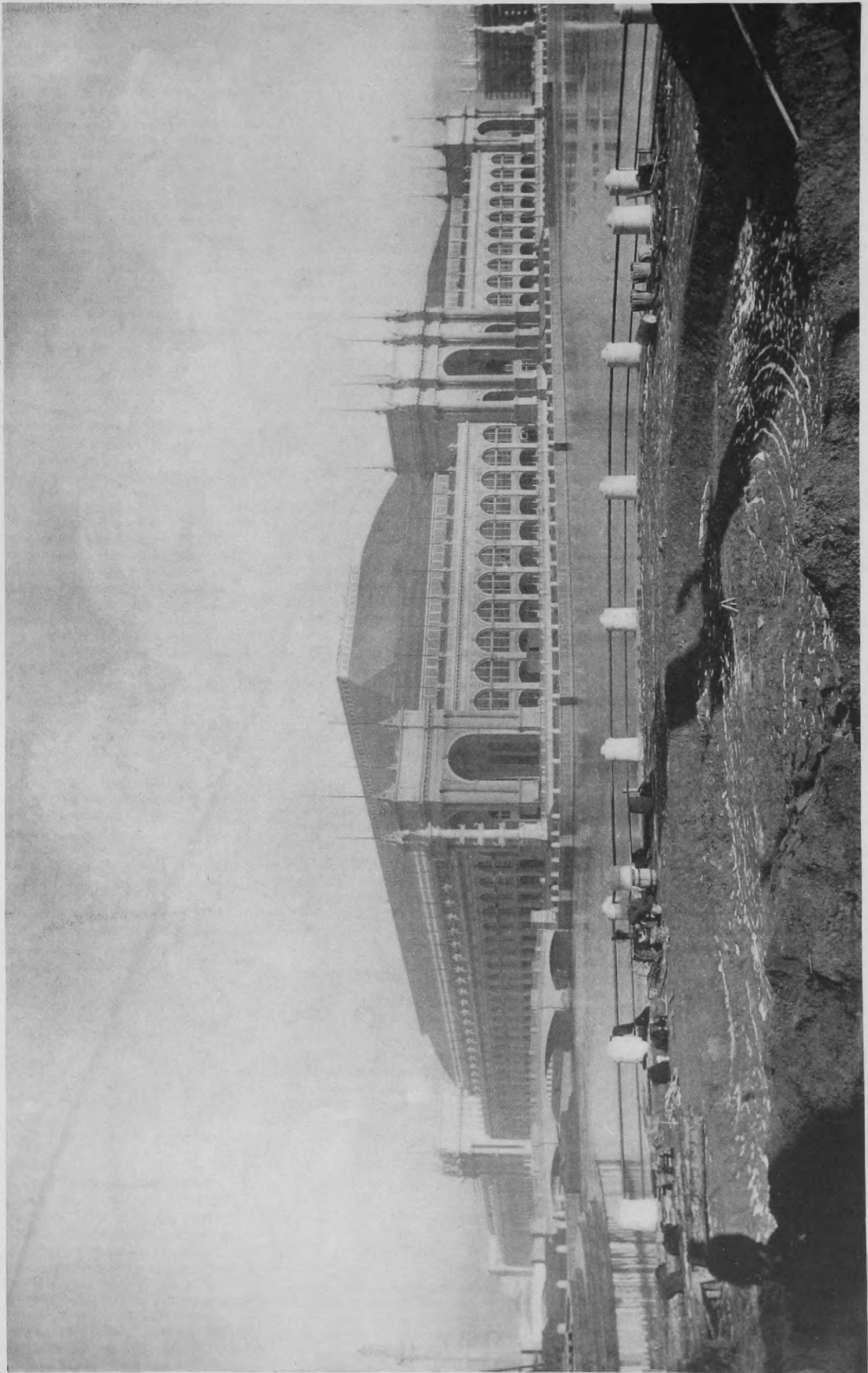
Within the building a gallery 50 feet wide extends around all four sides, and projecting from this are 86 smaller galleries, 12 feet wide, from which visitors may survey the vast array of exhibits and the busy scene below. The galleries are approached upon the main floor by 30 great staircases, the flights of which are 12 feet wide each. Columbia avenue, 50 feet wide, extends through the mammoth building longitudinally, and an avenue of like width crosses it at right angles at the center. The main roof is of iron and glass and arches an area 385 x 1400 feet, and has its ridge 150 feet from the ground. The building, including its galleries, has about 40 acres of floor space.

The Manufactures and Liberal Arts Building is in the Corinthian style of architecture, and in point of being severely classic excels nearly all of the other edifices. The long array of columns and arches which its façades present is relieved from monotony by very elaborate ornamentation. In this ornamentation female figures, symbolical of the various arts and sciences, play a conspicuous and very attractive part.

The exterior of the building is covered with "staff," which is treated to represent marble. The huge fluted columns and the immense arches are apparently of this beautiful material.

There are four great entrances, one in the center of each façade. These are designed in the manner of triumphal arches, the central archway of each being 40 feet wide and 80 feet high. Surmounting these portals is the great attic story ornamented with sculptured eagles 18 feet high, and on each side above the side arches are great panels with inscriptions, and the spandrels are filled with sculptured figures in bas-relief. At each corner of the main building are pavilions forming great arched entrances, which are designed in harmony with the great portals.

THE IRON AGE.



THE MANUFACTURES BUILDING OF THE WORLD'S FAIR.

The Iron Age

New York, Thursday, March 2, 1893.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, - - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

An Epoch in Shipbuilding.

That was a notable occasion last week when President Harrison, participating in the ceremony of raising the American flag on the International steamer "New York," said he believed "that we have reached an epoch in our development when we may successfully begin the work of carrying our share of the world's commerce upon the seas." The significance of the act was not so much in the placing of the Stars and Stripes over one of the finest specimens of naval architecture ever built in Great Britain, and which is now admitted to American registry, as the assurance given by the same act that several other steamers equal or superior in every respect are to be built within a brief period in American shipyards. When completed they will enter into competition with foreign steamship lines in the Atlantic trade on a basis of equality promising success as a business enterprise. There will be no lack of patronage, for they will enjoy the special favor of American tourists and will at the same time receive compensation under the new postal subsidy law sufficient in the aggregate to return a fair percentage of profit on an investment of \$2,295,000, which each of the new ships will cost. Confidence is felt that these ships will be the precursors of many others no wise inferior. If so, the Rubicon is crossed. The grand end to which protracted debates in Congress and in commercial bodies throughout the country have been directed for many years will have been achieved. The wearisome discussions about "free ships" will have been eliminated, for if we can build ships of the requisite standard and classification ourselves there is no necessity for building them abroad.

It is well to recognize in this culmination of all legislative acts for the upbuilding of American shipping on the ocean the several advance steps by which this measure of success becomes possible; and this, too, in the face of foreign rivalry in no degree relaxed. All expedients to this end hitherto devised, such as the admission of materials free of duty and the abatement of taxes, had failed. On inland waters, where there are no foreign government subsidies to contend with, the mercantile marine is acquiring an importance surpassing all calculation. To succeed correspondingly on the broad Atlantic, it was necessary to enter the field under new conditions and to resort to methods before untried. First of all, it was indispensable to establish plants on a mammoth scale adequate to the production of steamships of the largest class and to provide an equipment of ponderous tools and machinery; also to build docks

of the largest dimensions to receive these monster ships when undergoing repairs.

The report of the House Committee on Naval Affairs, just submitted to Congress, is a recapitulation of what has been done to reconstruct the American navy in the last ten years. In seeking this end there was no division of parties upon a question of policy. Up to 1886 no steel ship plates had been rolled in the United States, but after the construction of a new steel fleet had been authorized, progress was rapid. The most approved designs for ships and machinery were procured from abroad and a special plant for armor and gun forgings was established at Bethlehem. Later in 1886 a new stimulus was imparted to this branch of mechanical industry when Congress stipulated that the new ships which had been ordered should be of American material throughout, hulls, engines, armor and guns alike; and at the present day, the report says, "some at least of our American shipyards can turn out an unarmored vessel of the very highest type of excellence as quickly as can be done in the oldest shipyards of Europe." Another essential point of equal significance is that the extraordinary development here noted, together with a larger experience in manufacture, has brought about a decline in the cost of construction very remarkable when the comparative dearness of labor in the United States is considered. The committee says: "The price of the materials entering into the composition of a modern ship has been reduced fully one-half, and the price of a completed ship, excluding armor, has gone down 33 per cent." Thus it appears that the direct result of efforts to build a new navy to succeed the obsolete type of wooden vessels has been to call into existence all the appliances needful for the prosecution of shipbuilding on a scale commensurate with the unparalleled growth of the nation's commerce, which during the last fiscal year amounted to \$1,857,000,000, nearly all carried under an alien flag. The unfavorable discrepancy in the balance of trade, which is supposed to account in a measure for the present outflow of gold, will quickly vanish when the \$200,000,000 now paid annually in freight charges for ocean transportation can be divided in a fair proportion among the owners of American ships. Although a surfeit of steam shipping is seen in the thousands of idle tonnage now laid up in European ports, few intelligent Americans who discern the signs of the times will have the temerity to say that successful competition with foreign-built ships is still impracticable.

The price of wrought scrap in the leading iron markets of this country is about 50 per cent. of the base price of ordinary bar iron. In England the relative value appears to be only about 35 per cent., according to the best available information. It would seem, therefore, that either wrought scrap is disproportionately high in this country or remarkably cheap in England. The inroads made by steel on the bar-iron trade of the United States must sooner or later affect the price of wrought scrap. As it is not an article of staple production, but is a mere matter of salvage, the cause of its compara-

tively high price is difficult to comprehend. The law of supply and demand in this case seems to be inoperative. Stocks are understood to be heavy at various points, and there is certainly not a growing demand for the material from the bar-iron manufacturers. Another matter in this same connection which is difficult of explanation is the tendency of old iron rails to advance in the West. Consumers of old rails have had no improvement in the price of their product to warrant the payment of more money for materials.

All Chicago Tracks to be Elevated.

Persistent agitation against grade crossings by steam railroads in Chicago has at last borne definite fruit. The city council, on the 23d ult., by a unanimous vote, passed an ordinance to compel every railroad company operating tracks in the city to elevate them within a specified time. The city is divided for this purpose into three zones. The heart of the city forms the first district, within which the work of elevation must begin not later than July 1, 1893, and be completed by January 1, 1895. Very little mileage lies in this section. The second district is important, covering a zone which includes the terminals and a considerable length of track of every road. Work in this district is to begin not later than July 1, 1895, and be completed by January 1, 1897. The third zone takes in the suburban districts of the city, and work must there begin not later than July 1, 1897, and be completed by January 1, 1899. Regulations have been carefully provided to cover the character of the elevated roadbeds and their minimum height above the street grade. The roadbeds must be supported by girders of iron or steel, on iron or steel columns. The minimum height prescribed is 16 feet above grade.

The penalty provided for violation of the ordinance is ingenious. Not only are all tracks remaining at grade after the specified time declared to be a nuisance and to be removed and abated by the Commissioner of Public Works, but also the crossing of a street at grade by a locomotive or car is declared unlawful and every such act is a nuisance, finable in the sum of not less than \$100 nor more than \$200.

The railroad interests of Chicago are so vast and the burden imposed upon them by this action of the council is so great that at first blush it would seem too stupendous a task to be successfully carried through on the lines laid down. The elevation of all the tracks of steam roads now entering Chicago, if elevated over their present roadbeds, would cost an enormous sum, perhaps beyond the ability of any but the very greatest railroad financiers to raise. It is estimated that in the case of some of the roads an investment equivalent to one-fourth or more of their entire share capital would be necessary. Their side tracks and connections with factories along their line would have to be raised as well as the extensive yards which nearly all possess within some part of the city limits. To such a pitch, however, has public opinion been aroused on the subject of grade

crossings, in consequence of the increasing number of fatalities, that the railroad companies and the manufacturers who will be affected were not able to influence a single vote in opposition to the ordinance. It had been in course of preparation for a long time and all its provisions were very thoroughly considered before it was put upon its passage.

Now that the railroad companies are obliged to face the inevitable, busy brains will be put to work on plans which will accomplish the purpose with the least expenditure of money. It is probable that yards for the storage of freight cars will be gradually removed outside the city limits, to reduce the number of tracks to be elevated. It is further probable that more roads will unite in the construction of depots and terminal facilities than hitherto, and that the Torrence scheme of track elevation and terminals will be greatly amplified. The opportunity now exists for the display of the highest engineering talent and business ability in systematizing and concentrating the intramural railroad traffic of Chicago, so as to bear with as little burden as possible on individual roads. It is a great problem, but now that it is to be taken resolutely in hand a way will doubtless be found to carry it through in spite of the formidable financial obstacles apparently darkening the way.

Liability of Employers for Accidents to Workmen.

The vast majority of manufacturers are sure to be confronted, sooner or later, with the question as to what they propose to do to recompense an employee who has been injured while in their service. While they may employ every guard and safety device known, and while they may repeatedly caution and conspicuously post printed directions, a more or less serious accident is bound to come.

Accidents occurring in the ordinary machine shop may be said to be due to one of the three following causes: Where it is of an unprecedented nature and could not, therefore, be foreseen and guarded against; when long familiarity with a machine has rendered the operator careless; and finally when, through innate wickedness and perfect laziness an employee deliberately permits himself to be mutilated, trusting in the prospective suit for damages for his reward. With the second of these conditions we are all acquainted and have seen examples.

As illustrations of the first and third conditions, it is only necessary to mention two cases recently described to us by the proprietor of one of the most prominent machine tool manufacturing establishments in the country. A certain portion of the upper surface of a large casting was being planed. At the end of one of the cuts a piece was detached from the corner of the casting with such force as to permanently injure the eye of the operator, who chanced to be in range. This was one of those strange occurrences that could not be provided for. The firm promptly provided for the relief of their injured workman. The next case, in illustration of the third condition, was

injury caused by a large traveling crane. An employee deliberately put his hand upon the track and permitted the wheels to run over it. There was no sudden alarm, of any description, that would offer a reasonable explanation for his seeking support and placing his hand upon the track. His employers conceived that his action was deliberate and the matter was taken to court.

That the employer of men in almost every industry understands perfectly that those working for him may be injured is conceded, as is also the fact that it is the exception when an employer is not willing to repair, as far as lies in his power, any injury to one of his men.

A phase of this subject, more particularly applied to miners, is discussed in a recent editorial in *Engineering*. Our contemporary reviews the German law covering assurance against accident, which has been established about seven years. Employers are compelled to provide an insurance fund from which to reimburse those of their employees who meet with accidents, however they may be caused. In England employers and employed carry on joint funds for insurance against accidents in mining industries. Commenting upon the German method, our contemporary says:

The most striking feature of the German system of State insurance against accidents is the serious increase of cost that it has entailed from year to year upon the employers, who are compelled by law to provide the whole of the funds required. This is the essential difference between the German system and our own.

In other words, one is compulsory and the other voluntary, as far as the employer is concerned.

Generally speaking, in the absence of State compulsion, the two classes concerned are in Great Britain ready to share the burden, and in the mining industry a considerable part of the workman's earnings are regularly set aside to make this provision. The employer is generally ready to add to whatever fund is thus established, a moiety, at least, of the amount provided by the workmen, and the fund being jointly administered, it affords a desirable and a useful opportunity of bringing the two sides together and enabling them better to understand and appreciate one another. The funds provided in this way in the principal mining districts have been very considerable, but in some localities the recent course of the fund has not been satisfactory.

Mr. Chamberlain would make employers wholly and solely responsible for the indemnification of those who suffer accidents in their employ, and he suggests that the tax so levied upon capital should be recouped by an increase of the price of the commodity produced, so that, in the long run, the expenditure incurred should be paid by the general public as consumers.

The question is a debatable one in almost all industries and in every country largely interested in manufacturing. The exact relationship of the employer to the employee—accidents to the latter only considered—and the proper grading of the nature of the accident, and the "contributory negligence" of the employee himself, are the most important factors of the problem. We do not think these points can be satisfactorily settled by any arbitrary arrangement such as is proposed by the German law.

The Western papers report a peculiar migration in progress. Farmers are removing from various localities in States

east of the Mississippi river to Southwestern Minnesota, Northwestern Iowa and to Nebraska. The cause of their removal is stated to be the high value of the land which they have tilled for years and the very low price at which they can obtain good farms further West. The enhancement in value is a temptation to those who own their farms to realize, while in other cases landlords are demanding increased rentals this year to correspond with the improvement in value, thus almost forcing their tenants to look elsewhere. Only a few years since, cash rents were \$1.50 to \$3 per acre but are now \$3 to \$6. The movement promises to reach large proportions, in some localities having already assumed the appearance of an exodus.

PERSONAL.

H. C. Frick, chairman of the Carnegie Steel Company, Limited, accompanied by his family, will sail for Europe on Saturday, March 4. Mr. Frick will remain abroad for an extended period and goes for the purpose of obtaining a much-needed rest.

Stephen G. Collins, formerly connected with the Lehigh Valley Railroad, has resigned his position as treasurer of the Pottstown Iron & Steel Company, to take effect March 1.

F. G. Fricke has resigned his position as chemist at the Lucy Furnaces, Pittsburgh, and has established himself as analytical and consulting chemist in the Ferguson Building, Pittsburgh.

W. D. Rees, who has for several years been identified with the Republic Iron Company, will on May 1 succeed Jay S. Fray, Jr., of Boston as treasurer and managing director of the Lake Erie Iron Company.

The great necessity of the artisans of the United States, the *Chicago Herald* says, is to be able to embody their ideas, either by drawing them or modeling them so that others may see their practical value. A workman who can draw has an incalculable advantage over the workman who cannot draw or model in clay or putty. The inventor who conceives the most valuable things is helpless if he cannot draw them or put them otherwise into palpable form.

It is said that an agreement has been made between Boston and New York sole leather firms, representing a capital of some \$45,000,000, with the view of controlling the output of the tanneries under their control, and consequently the price of sole leather. For years the leather market has been regulated by exporting the surplus to Europe, often at a sacrifice in price.

The Peter Cooper estate will build a \$1,000,000 hotel in Fourth avenue, between Twenty-seventh and Twenty-eighth streets. Work will be begun shortly.

The New York City authorities will begin next spring to dump garbage at Riker's Island, and thereby reclaim 400 acres for building purposes. Later, crematory furnaces may be resorted to.

Last year was the most prosperous ever enjoyed by the cotton mills of South Carolina. Some of them made as high as 42 per cent. on their investments.

CORRESPONDENCE.

The Sheet-Metal Gauge Bill.

To the Editor: It is earnestly to be hoped that Congress will not pass the Sheet-Metal Gauge bill, as described in your issue of February 9, without at least making in it important modifications, as the absurdities apparent upon the face of it, when glancing at the table you quote, are sufficient to condemn it in the eyes of any systematic engineer. Among these are the ciphers (in one case extending up to seven) at the beginning of the series of size numbers, instead of beginning with unity. Also the following of the old system of putting small numbers for the larger thicknesses, and *vice versa*. Also the actual sizes of the gauge dimensions themselves, which run in very curious fractions that are not measurable by ordinary tools. The only good and systematic thing about this proposed system is that the respective gradations agree with certain definite numbers of ounces per square foot of iron or steel, these two happening to be of about the same specific gravity. This very fact, however, makes the gauge unfit for measuring, by the same system, tinned or galvanized sheet iron, brass, copper, zinc, aluminum, silver, gold and other metals, as well as paper, leather, &c.; and it also makes it unsuitable for a wire gauge for all kinds of material, including iron. Exactly how the interesting groups of seven, and six, and five ciphers above mentioned are to be pronounced in speaking, we have not been informed.

Just why we should have saddled upon us a law of this kind, after which we shall have to use various other gauges for wire, screws, rivets and nearly all the sheet metals, passeth ordinary comprehension. It is certainly to be hoped that the bill in its present shape will be defeated, and that some forthcoming action by the American Society of Mechanical Engineers, and perhaps by other scientific societies, will be productive of good in leading the way toward a sensible gauge of some kind. Such, for instance, might be one founded upon the actual fractions of an inch involved, these preferably being expressed in thousandths. This perfectly simple and natural method was proposed by me at the Erie meeting of the American Society of Mechanical Engineers, and has more than once been promulgated in your columns since that time. All there is to do is to make gauges to suit different trades with such notches in them as may respectively suit each case in question. These notches have only to be numbered by the number of thousandths of an inch that measure them, and everything will agree—even though some gauges may have entirely different sequences of numbers from others.

Yours truly, OBERLIN SMITH.

The Simon-Carvès Ovens with Recovery of By-Products.

To the Editor: Your contemporary, the *Journal of Gaslighting*, London, January 24, 1893, gives some correspondence interesting to coal owners and iron makers from the pen of A. L. Steavenson of Durham, on the above subject; he also quotes the authority of F. P. Dewey, to substantiate, if possible, his charges against the quality of our coke. Mr. Steavenson commences his letter with the homely adage of "You cannot eat your cake and have it." I do not quite see its application to the subject he deals with, but in replying to his letter I may justly and appropriately quote another domestic proverb, "The proof of the pudding is in the eating."

This is not the first time Mr. Steavenson has expressed his bias against "close oven coke," although I am not aware that he

has ever had any great personal experience of its manufacture or its use on a considerable scale.

It is only fair to Henry Simon of Manchester, who introduced the Simon-Carvès ovens into this country, and who, it will be seen by and by, thereby did a great service to the iron industry, that the following facts should be known:

1. Coke made in similar ovens to the Simon-Carvès ovens is almost universally used in Silesia, Westphalia, to a large extent in France, Belgium, Spain (in the latter country with Durham coals), Austria and other countries, and in each district the number of ovens is increasing enormously.

2. Pease & Partners of Darlington were the first English coke makers to put down an installation of these ovens in the year 1881. Since then so successful have they proved that they have four times increased the number they commenced with.

3. The Bearpark Coal & Coke Company, Durham, Messrs. Mecapine; Altham Collieries, Whinney Hill, Accrington, Messrs. Wedgewood; Bignall Hill Colliery, Newcastle, Staffordshire, and the Micklefield Coal & Lime Company, near Leeds, have each a number of Simon-Carvès ovens working most satisfactorily and disposing without any difficulty of the coke and by-products they produce.

We are at present building 70 ovens on the same lines at Lanchester near Durham and Mr. Simon and Mr. Carvès, together with Colonel Sadler, own almost the entire share capital. This does not look like want of confidence, and, notwithstanding the prejudice of so-called practical men, there is not a shadow of doubt that this class of coke will be the fuel of the future for iron smelting, for the simple reason that it will be the cheapest, as it has been conclusively proved to be on the Continent and elsewhere. Notwithstanding all statements to the contrary, the fact remains: Continental iron-makers use less of this coke per ton of iron made than do English iron makers of their beloved beehive coke. As I can substantiate this statement, it is not necessary for me to say anything about the density, porosity or superficial appearance of our coke, concerning which Mr. Steavenson has so much to say.

Surely it is not at all a question whether certain coke is the most perfect coke imaginable in every respect, but whether a coke possibly not entirely corresponding to this ideal coke comes in so much cheaper that the advantages of its use vastly overbalance any possible small and imaginary drawback. I remain

Yours obediently,

W. SCHROLLER, M. I. Mech. E.
Resident Engineer of the Durham Coke & By-Products Company, Limited.
LANCHESTER, NORTH DURHAM, February 9, 1893.

Failure of the Cofrode & Saylor Company.

The failure of the Cofrode & Saylor Company of the Philadelphia Bridge Works of Pottstown, Pa., with an office in Philadelphia at 257 South Fourth street, was a surprise in iron and steel trade circles.

The company were chartered on February 17, 1890, with a capital stock of \$500,000, divided into 5000 shares of \$100 each, par value, \$400,000 of which is full paid. The collapse of the company was, it is stated, consequent in a great measure upon the general depression in the iron trade, owing to overproduction, and general closeness in money owing to other failures in the neighborhood. A bill in equity was presented, upon which the court appointed Wm. F. Harry and Joseph H. Cofrode receivers, with security to be entered in the sum of \$150,000 each. The bill was filed by the following credit-

ors and stockholders and showed the indebtedness mentioned: George W. Bush & Sons Company of Wilmington, Del., \$3000 and notes of the defendant company, partly unsecured, aggregating \$32,500; Livingston Saylor and Robert B. Grimacy, \$150 and \$200, respectively, for salary in addition to small stock holdings; the Paxton Rolling Mills, \$22,260, and Francis H. Saylor, a stockholder to the amount of \$249,800, and an indorser of notes to the extent of \$56,547, which, it is stated, are about to mature, and are unprovided for.

The product on hand in finished and unfinished state exceeds by \$100,000 the cost of the firm's real estate, plant and machinery, and the outstanding accounts exceed \$50,000. The liabilities are stated to be very large and to include bonds to the amount of \$24,000, part of a bonded obligation of \$250,000 secured by a mortgage of the real estate held by trustees for the benefit of the bondholders, the residue being held as collateral security for obligations of the corporation. Other items of indebtedness are \$500,000 on bills payable, \$50,000 accounts payable, and \$3000 employees' wages.

The business transacted has amounted to about \$2,000,000 per annum, and there are a large number of contracts on hand.

The bill cited that the Board of Directors of the company are powerless to continue operations for want of funds, and asked for a decree of insolvency; an order for the sale of the company's property under the direction of the Court; an injunction restraining the company from making any sale or transfer of property or assets; and for the appointment of receivers to take charge of the company's affairs and to make equitable distribution.

The receivers propose to take charge of the company's property at once, and to publish a statement as quickly as possible.

It is stated that the works will be continued in operation without interruption, and that all contracts will be finished.

The Reading Rolling Mills.

The connection of the Cofrode & Saylor Company with the Reading Rolling Mills has led to much talk regarding the solvency of the latter.

The Cofrode & Saylor Company own \$75,000 of stock in the Reading Rolling Mills Company, while Mr. Cofrode owns personally \$65,000 and Mr. Saylor \$60,000, the corporation and individual holdings amounting to \$200,000 of stock. The entire capital stock is \$300,000, full paid. The balance of the stock in the company is held by George W. Bush, J. F. Bailey and others.

The Reading Rolling Mills Company were incorporated in 1889, and leased the rail mill of the Philadelphia & Reading Railroad Company for a term of 99 years.

The daily output of the works is about 100 tons of finished material.

As an organization the Reading Company are separate and entirely distinct. It is freely stated that they are in every way solvent and have more than enough material in process of manufacture to pay all their indebtedness. It is probable, however, that, owing to its connection with Cofrode & Saylor, it will be deemed advisable to go into receivers' hands.

This action, however, would be merely temporary, as the assets of the mills would speedily allow of a settlement of every claim in full.

J. F. Bailey & Sons, iron commission merchants of Philadelphia, suspended payment on Saturday, the 25th ult. The senior partner is one of the most prominent and best known men in the trade, and has done an immense trade in bridge and structural material during the past 20 years. Mr. Bailey was formerly with A.

P. Roberts & Co. of the Pencoyd Iron Works, but went into business on his own account about 1877 or 1878, and until recently has been very successful. Some two or three years ago he became interested in a copper mill plant, in which he invested quite a large amount of money. This concern was known as the Philadelphia Copper Mill Company, but was closed three or four months ago. Mr. Bailey finding himself unable to furnish sufficient working capital, thought it best to suspend operations at once, and so far as that venture is concerned it is understood that there is no outstanding indebtedness. The firm of J. F. Bailey & Sons will probably be able to make some arrangement with their creditors, by which the business can be carried on, but it is impossible to say anything definite on that point until a statement of their affairs is presented. Their relations as selling agents for the Reading Rolling Mill Company were very close, but there is a feeling in the trade that with a little leniency the firm of J. F. Bailey & Sons will not fall very much behind.

Tin and Terne Plate.

IRA AYER'S REPORT.

Ira Ayer, special agent of the Treasury Department for the collection of statistics of the production of tin and terne plates in the United States, has issued the following report for the quarter ending December 31, 1892: I have the honor to report that during the quarter ended December 31, 1892, 32 firms produced 19,756,491 pounds of tin and terne plates proper. The same number of firms produced during the previous quarter 10,952,725 pounds. Of the production of the past quarter 6,138,739 pounds, or a little less than one-third of the whole, were bright tin plates, of which 5,274,434 pounds, or about 86 per cent., consisted of the class of plates weighing lighter than 63 pounds per 100 square feet; 13,617,752 pounds were terne plates, of which 12,684,646 pounds, or more than 93 per cent., belonged to the lighter class; of the entire product nearly 91 per cent. consisted of the lighter class of plates.

The amount of American sheet iron and steel made into articles and wares tinned or terne during the quarter, as shown by the sworn statements of manufacturers received to date, was 2,245,506 pounds, and for the previous quarter 898,233 pounds. This makes the total production for the last quarter, within the meaning of the law, 22,001,997 pounds, against 11,850,958 pounds produced during the quarter ended September 30, 1892, and shows a total production for the six months ended December 31, 1892, including the products from American sheet iron and steel tinned of 33,852,955 pounds.

The production of tin and terne plates proper during the first six months of the present fiscal year was 30,709,216 pounds, against 2,236,743 pounds produced during the corresponding period of the previous year, the ratio of increase having been nearly as 1 to 14. The production of the last fiscal year was 13,646,719 pounds, which is considerably less than one-half the production during the first six months of the present year.

American Black Plates.

Of the production of 19,756,491 pounds of tin and terne plates proper during the past quarter, 8,043,449 pounds, or more than 40 per cent., were made from American black plates, against 5,920,082 pounds used during the previous quarter. The consumption of American plates in the production of tin and terne plates proper during the first six months of the

present fiscal year was 13,963,531 pounds, or 316,812 pounds more than the total product of tin and terne plates proper during the first year that the law became operative. The consumption of American plates for the same purpose during the first six months of the fiscal year ending June 30, 1892, was 1,986,208 pounds, the ratio of increase for the corresponding period of the present fiscal year having been as 1 to 7. The total consumption of American plates, including articles made from sheet iron or steel and tinned, during the first six months of the last fiscal year was 4,474,755 pounds, and for the first six months of the present fiscal year 17,107,270 pounds.

Of the 32 firms who submitted their sworn returns for the quarter nine made and used their own black plates exclusively, four others used only American plates, nine used both American and foreign plates and ten used only foreign plates. The American plates are generally preferred by manufacturers to the foreign.

The foregoing figures are taken from the sworn statements of manufacturers, the details of which have been tabulated in Exhibit 1, appended hereto. A summary of production for the four quarters of the last fiscal year and for the first two quarters of the present year is also appended (Exhibit 2). To these exhibits attention is respectfully invited.

Imports and Exports.

Full returns from the importing and exporting ports of the country show that the imports of tin and terne plates, and the exports of the same in the form of manufactured articles, with benefit of drawback, were as follows:

	Lighter than 63 pounds per 100 square feet.	63 pounds per 100 square feet and heavier.
IMPORTS.		
Tin plates.....	332,328,123	14,519,549
Terne plates.....	42,368,883	1,334,147
Totals.....	374,697,006	15,853,696
EXPORTS.		
Tin plates.....	136,740,638	480,847
Terne plates.....	32,552	155
Totals.....	136,773,190	481,002

From the foregoing it is seen that of the class of plates weighing lighter than 63 pounds per 100 square feet there were imported

During the fiscal year ended June 30, 1892.....	Pounds. 374,697,006
And of the same class of plates there were exported.....	136,773,190

Making the net importations for the year.....	237,923,816
One-third of which is.....	79,307,939

Under existing provisions of law American manufacturers must produce, during one of the six fiscal years ending June 30, 1897, one-third of the net importations of one of the said years. If it be assumed that the net importations will not be less during any one of the remaining years specified, the amount of the lighter class of plates which must be produced by American manufacturers during one of the six years in question may be positively stated at 79,307,939 pounds.

As shown in former reports, it is probable that this amount will be equaled during the present fiscal year.

Present State of the Industry.

It has been seen that during each of the first two quarters of the present fiscal year 32 firms were engaged in the production of tin and terne plates proper, and made their sworn returns to the Government. Three firms were added to the list of producers during the last quarter, viz,

the Blairsville Rolling Mill & Tin Plate Company of Blairsville, Pa.; the Morewood Tin Plate Mfg. Company of Elizabethport, N. J., and the Phillips Tin Plate Company of Philadelphia, Pa.

Two firms which made returns for the quarter ended September 30, 1892, were not producing during the past quarter, owing to temporary causes. The works of the Anderson Tin Plate Company of Anderson, Ind., were destroyed by fire and will probably not be rebuilt.

The Baltimore Steel, Iron & Tin Plate Company of Baltimore, Md., commenced working three tin sets about January 1, 1893, and state that they will soon have two additional sets in operation.

The Britton Rolling Mill Company of Cleveland, Ohio, inform me that they have most of the machinery on hand for their tin-plate department, but add that it is doubtful if they will proceed further until something definite is known relative to the action of Congress as affecting these interests.

The Canonsburg Iron & Steel Company of Canonsburg, Pa., have added two tin mills to their plant during the past year, and claim that they have a present capacity for stamping and black plates of about 6000 tons per year. Probably not more than one-fourth of this, they state, will be used as ordinary black commercial plates for tinning. A portion of the remainder is used in the manufacture of stamped ware, much of which is tinned. Some is used for polished work and for a variety of purposes, and does not require to be tinned, although the finish is said to be the same as for tin plates.

The Corning Steel Company of Chicago, Ill., write that the demand is so great for common black sheets that they have not attempted to make any regular black plates, preferring to keep their mill, for the present at least, on the common material. This firm have therefore been dropped from the list of manufacturers.

The Cumberland Steel & Tin Plate Company of Cumberland, Md., report that they started their works January 10, 1893, and have at present an output of 6 tons of black plate daily, the principal gauges being 28 and 30. Their expectation is that before July 1 next the capacity will be increased to 20 tons daily. The present output, they state, is sold to tinning houses in Pittsburgh and Philadelphia, and add that the entire product will be used for tin and terne plates.

The Morewood Company, located at Gas City, Ind., state that they have already completed four large iron buildings and have other buildings in course of construction, all of which are intended for tin plate manufactures.

The Falcon Iron & Nail Company of Niles, Ohio, state that they have met with unlooked for delays in securing the structural iron for their buildings, which should have been erected as early as December 1, 1892. The machinery is all on the ground, and the most of it set in place. They now expect to have two tin mills in operation by April 1, and estimate their output at 400 tons of tin plate per month. They will roll the sheets for tinning from the steel billet. Their machinery is built for four mills. They represent that they will at first sell their black plate product to parties who are engaged in tinning, but will commence work in the spring on their tinning department. The company propose to build a first-class plant throughout.

The firm of Hughes & Patterson, owners of the Delaware Rolling Mill of Philadelphia, Pa., have begun the erection of substantial buildings for the production of tin plates, but state that it will be some months before they will be in a condition to begin the actual manufacture.

The Indiana Tin Plate Company of Atlanta, Ind., state that the hard winter

has considerably checked the progress of their buildings. They now hope to be in operation by March 1. They add that their present obligations are to erect a plant of two rolling mills, with the necessary finishing department, at a cost of from \$80,000 to \$100,000.

As neither the International Tin Plate & Refining Company of Chicago, Ill., nor

together with the continued erection of buildings and plants, as herein shown, serve to confirm the view expressed in a former report relative to the permanent establishment of this industry. In this connection the substantial increase in the production of American black plates is particularly noticeable.

In Exhibit 3, which gives a revised list

Exhibit 3.—Revised list of firms or companies engaged in tin and terne plate manufactures, December 31, 1892.

[a, Producing; b, building; e, enlarging; *, making or preparing to make black plates.]

Note.—From the following list are omitted the names of all firms or companies who had not begun actual building operations December 31, 1892.

A. A. Thomson & Co., a, New York, N. Y.
Alliquippa Tin Plate Company, + a, Alliquippa, Pa.
American Stamping Company, a, Brooklyn, N. Y.
American Tin Plate Company, * a, Elwood, Ind.
American Tin Plate Machine & Mfg. Company, + a e, Philadelphia, Pa.
American Tin & Terne Plate Company, a, Philadelphia, Pa.
Apollo Iron & Steel Company, * a, Apollo, Pa.
Baltimore Steel, Iron & Tin Plate Company, b, Baltimore, Md.
Britton Rolling Mill Company, * b, Cleveland, Ohio.
Blairsville Rolling Mill & Tin Plate Company, * a, Blairsville, Pa.
Cincinnati Corrugating Company, a, Piqua, Ohio.
Cleveland Tin Plate Company, a, Cleveland, Ohio.
Coates & Co., * a, Baltimore, Md.
Columbia Tin Plate Company, a, Piqua, Ohio.
Cumberland Rolling Mill & Tin Plate Company, * a e f, Cumberland, Md.
E. Morewood & Co., * b, Gas City, Ind.
Falcon Iron & Nail Company, * b, Niles, Ohio.
Griffiths & Cadwallader, a, Pittsburgh, Pa.
Gummey, Sperring & Co., a, Philadelphia, Pa.
Hughes & Patterson, * b, Philadelphia, Pa.
Indiana Tin Plate Mfg. Company, * b, Atlanta, Ind.
John Hamilton, a, Pittsburgh, Pa.
Kahn Bros., a, New York, N. Y.
Marshall Bros. & Co., * a, Philadelphia, Pa.
Matthai Ingram & Co., a e, Baltimore, Md.
McKinley Tin Plate Company, a, Wilkesburg, Pa.
Merchant & Co., a, Philadelphia, Pa.
Morewood Tin Plate Mfg. Company, a, Elizabethport, N. J.
N. & G. Taylor Company, a e, Philadelphia, Pa.
Norton Bros., * a e, Chicago, Ill.
New Castle Tin Plate Company, * b, New Castle, Pa.
Norristown Tin Plate Company, a, Norristown, Pa.
Phillips Tin Plate Company, a, Philadelphia, Pa.
P. H. Laufman & Co., Limited, * a, Apollo, Pa.
Pittsburgh Electro-Plating Company, a, Apollo, Pa.
Pittsburgh Tin Plate Works, a, New Kensington, Pa.
Record Mfg. Company, a, Conneaut, Ohio.
Scott & Co., Jas. B., a, Pittsburgh, Pa.
St. Louis Stamping Company, * a e, St. Louis, Mo.

Exhibit 1.—Abstract of Tin Plates and Terne Plates Produced in the United States during the Quarter ended December 31, 1892.

[The detailed entries in this abstract are taken from the sworn returns of manufacturers.]

Tin plates.				Terne plates.				Amount made from		Total.
Lighter than 50 pounds per 100 square feet.	50 pounds per 100 square feet.	62½ pounds per 100 square feet.	63 pounds per 100 square feet and heavier.	Lighter than 50 pounds per 100 square feet.	50 pounds per 100 square feet.	62½ pounds per 100 square feet.	63 pounds per 100 square feet and heavier.	American black plates.	Foreign black plates.	
Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.
563,770				137,081	245,280	134,088	40,500	700,851	285,780	700,851
	40,096		50,260		512,609	87,976	63,650	221,982	512,609	646,697
	78,300	0,615	320		171,075	12,852		171,075	98,087	171,075
585,801	977		4,815					541,593	541,593	541,593
					107,406			51,581	55,825	107,406
	132,731	58,825	18,487		627,424			627,424	627,424	627,424
586	10,476	180,414	77,407		180,965	121,581	2,290	249,295	53,251	302,546
48,000	132,040		28,000		309,198		38,738	560,269		560,269
	36,217		299,945					430	268,453	268,453
					1,364,688			100,000	138,000	208,000
201,390	146,983	12,025	84,565		792,509	834,883	16,122	1,875,551	1,875,551	1,875,551
74,346	94,443	7,200						1,364,688	1,364,688	1,364,688
10,800					2,200,932			2,287,080	2,287,080	2,287,080
	18,468	4,350				234,328		48,965	127,024	175,989
						84,240			2,446,060	2,446,060
	27,162		16,800			23,307		1,030	106,028	107,058
						337,280		197,259	220,566	220,566
		66,411	77,920			234,148		337,260	337,260	337,260
	634,186	225,221	99,087				112,340	185,540	254,920	440,440
	289,872					178,086	20,446	144,331	144,331	144,331
	150,380	101,994	56,363			713,047	168,084	179,058	84,585	263,643
280,664	216,801	305,074	38,700					1,839,625	1,839,625	1,839,625
						516,106	51,036	289,872	289,872	289,872
						249,320		875,879	875,879	875,879
							434,800			434,800
		205,483	11,656					1,092,179	1,092,179	1,092,179
						129,355				129,355
						98,000		98,000		98,000
1,527,970	2,572,852	1,173,612	864,305	5,007,819	6,424,456	1,222,371	933,106	8,043,449	11,713,042	19,756,491

the Joliet Tin Plate Company of Joliet, Ill., report any progress, their names have been stricken from the list of manufacturers.

The New Castle Steel & Tin Plate Company of New Castle, Pa., which is building a large and substantial plant,

of manufacturing firms December 31, 1892, I have adhered to estimates of production heretofore made. The estimated investment in buildings and plants, close of fiscal year ending June 30, 1893, as shown in my report of October 24, 1892, has been reduced.

Exhibit 2.—Summary of Production.

Period from	Tin plates.			Terne plates.			Tin and terne plates.	Amount made from		Total.
	Lighter than 50 pounds per 100 square feet.	50 pounds per 100 square feet.	Total.	Lighter than 50 pounds per 100 square feet.	50 pounds per 100 square feet.	Total.		American black plates.	Foreign black plates.	
	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.		Lbs. net.	Lbs. net.	Lbs. net.
July 1, 1891, to Sept. 30, 1891.	134,869	17,620	152,489	442,552	231,881	674,433		785,547	41,375	826,922
Sept. 30, 1891, to Dec. 31, 1891.	181,501	34,410	215,911	1,046,879	147,081	1,193,910		1,200,661	209,160	1,409,821
Jan. 1, 1892, to Mar. 31, 1892.	1,018,698	80,956	1,099,654	1,907,869	201,700	2,109,569		2,132,082	1,077,143	3,209,225
April 1, 1892, to June 30, 1892.	2,796,941	274,593	3,071,534	4,795,236	333,981	5,129,217		5,178,263	3,022,488	8,200,751
Total...	4,132,009	407,581	4,539,590	8,192,536	914,593	9,107,129	13,646,719	9,296,553	4,350,166	13,646,719
July 1, 1892, to Sept. 30, 1892.	3,337,036	274,331	3,611,367	6,875,958	465,400	7,341,358	10,952,725	5,920,082	5,032,643	10,952,725
Oct. 1, 1892, to Dec. 31, 1892.	5,274,434	864,305	6,138,739	12,684,646	933,106	13,617,752	9,756,491	8,043,449	11,713,042	19,756,491
Total.....	8,011,470	1,135,636	9,147,106	19,560,604	1,398,506	20,959,110	30,709,246	13,963,531	16,745,685	30,709,216

report that it will be June or July before they get into operation.

The sworn statements of manufacturers show a steady and regular increase of production from quarter to quarter, and taken

I also append (Exhibit 4) a list of stamping and manufacturing companies, who use American sheet iron and steel in the production of articles and wares tinned or terne coated.

Somerton Tin Plate Works, * a, Brooklyn, N. Y.
United States Iron & Tin Plate Mfg. Company, * a, Demmler, Pa.
Wallace, Banfield & Co., Limited, * a, Irondale, Ohio.

Total number of companies, December 31, 1892.....	42
Number of companies manufacturing December 31, 1892.....	32
Number of companies building December 31, 1892.....	7
Number of companies enlarging works December 31, 1892.....	6
Number of companies making or preparing to make black plates December 31, 1892.....	18
Production tin andterne plates proper, fiscal year ended June 30, 1892, pounds.....	13,646,719
Production tin andterne plates proper, six months ended December 31, 1892, pounds.....	30,709,216
Estimated production tin andterne plates, fiscal year ending June 30, 1893, pounds.....	100,000,000
Estimated annual rate of production, close of fiscal year ending June 30, 1893.....	200,000,000
Estimated investment, buildings and plant, close of fiscal year ending June 30, 1893.....	\$3,500,000

+ Made no returns quarter ended December 31, 1892.

* Making black plates only.

Exhibit 4.—List of stamping or other manufacturing companies who use American sheet iron or steel in the production of articles and wares tinned or terne-coated.

Note.—The following list embraces only such firms or companies as made sworn returns of production to the Government for the quarter ended December 31, 1892:

Acme Shear Company, Bridgeport, Conn.
 Avery Stamping Company, Cleveland, Ohio.
 American Stamping Company, Brooklyn, N. Y.
 Buhl Stamping Company, Detroit, Mich.
 Chicago Stamping Company, Chicago, Ill.
 Central Stamping Company, New York, N. Y.
 Dover Stamping Company, Cambridgeport, Mass.
 Eberhard Mfg. Company, Cleveland, Ohio.
 Iron Clad Mfg. Company, Brooklyn, N. Y.
 Knapp & Pratt Mfg. Company, Geneva, Ohio.
 Lalance & Grossjean Mfg. Company, New York, N. Y.
 Mix, G. I., & Co., Yalesville, Conn.
 Parker Company, Charles, Meriden, Conn.
 Sidney Shepard & Co., Buffalo, N. Y.
 Wallace Mfg. Company, R. L. & Sons, Wallingford, Conn.

The Duty on Tin.

On Tuesday the House of Representatives, on motion of Chairman Springer of the Ways and Means Committee, passed the bill repealing that section of the Mc Kinley bill which imposes a tax of four cents a pound on pig tin after July 1 next. The bill is expected to go to the Senate in a few days, when it is expected it will be put through without opposition.

Measurement of Roofs.

A new idea has occurred to a New Westminster, B. C., roofer, for measuring roofs of buildings, says an exchange, which he thinks of importance to those who estimate quantities, and which may prove of interest to many others engaged in the sameline. It is this: Find the whole horizontal area of the roof by dividing it into quantities or sections. To these quantities add the fractions thereof necessary to raise them to the required quantity, which is in a roof of square pitch, 5.12; in a roof of 9 inches rise to the foot, one-fourth, and so on, according to the varying pitches. This is equal to raising the quantity representing one of the sides from 12 to 17, or 12 to 15, as in the pitches mentioned respectively. This will apply only to a roof in which all the pitches are equal, but can be made approximately correct by taking a mean between, or it may be made correct by considering the portions separately.

A Connecticut company has been organized to build a dam across the Housatonic River at Oxford to obtain power for operating dynamos, which is to be transmitted to the cities of New Haven and Bridgeport for industrial purposes.

MANUFACTURING.

Iron and Steel.

A press dispatch from Frostburg, Md., states that a tin-plate plant is about to be established in that city. W. R. Perry and others are interested in the enterprise, and John J. Jones, it is stated, will manage the plant.

Indications now are that the plant of James P. Witherow, engineer and contractor at Newcastle, Pa., which has been idle for more than a year on account of the failure of Mr. Witherow, will resume operations some time during March. The final order of court directing Alexander Thomas, assignee, to sell the plant to the James P. Witherow Company was made in Pittsburgh last week, and the property will be transferred in a few days. There are still two small judgments against the old firm, amounting to about \$1100, but these will be paid off in cash. The new concern will operate the plant under an arrangement that is said to be very satisfactory to the creditors. The delay in putting the affairs of the embarrassed firm in shape was due to the delay in raising \$75,000 to pay off claims which it was necessary to liquidate before the plant could be transferred to the new company. Considerable satisfaction has been expressed by the principal creditors of James P. Witherow over the able manner in which the affairs of Mr. Witherow have been conducted by Alexander Thomas, who was appointed assignee in January, 1892.

In the courts at Milwaukee, Wis., last week, suit was entered against the Philadelphia & Reading Coal and Iron Company by the Brown Hoisting & Conveying Machine Company of Cleveland, Ohio, on a claim of \$25,000, and attachments were granted on the Reading coal yards.

Some time ago Moorhead, Brother & Co. of Pittsburgh, operating the Vesuvius Iron and Nail Works, at Sharpsburg, Pa., notified their puddlers that boiling would be reduced from \$5.50 to \$5 per ton. The men refused to accept the reduction, and, as a consequence, little or no work has been done in that department for some time. This firm, as in the case of many others, are doing away with the work of puddling and are substituting steel. The report that the plant of the firm would be removed from Sharpsburg to Millvale is without foundation.

The plant of the Kittanning Iron Company, Limited, at Kittanning, Pa., which has been idle for about five months, started up last week, giving employment to about 200 men. Muck bars is the exclusive output of this concern, which are used largely in the Pittsburgh market.

Henry Wick, president of the Ohio Steel Company, Youngstown, Ohio, has recently furnished some information regarding the equipment of the Bessemer steel plant now being built by this concern. The new concern expect to turn out from 1000 to 1400 tons of billets per day, and hope to be in operation on January first next. There will be three cupolas in the cupola house, two 10-ton converters and a 20-ton hydraulic crane in the converting house, 15 soaking pits, blooming mill, shears, &c. The machine shop will be a brick structure, with an iron roof, measuring 82 x 89 feet, containing large tools for doing the necessary repair work, a brick engine house, containing a blowing engine, hydraulic pumps, feed water pumps, electric engines for generating electricity for both light and power. The power thus generated will be used for operating large electric traveling cranes, centrifugal pumps, located at the river, operated by motors which receive their current of electricity through cable, extending the distance lying between the generating plant and the river. A large cast-iron pipe, about 1500 feet long, through which the general water supply is to flow, has an inside diameter of 20 inches, and will afford a supply of 4,000,000 gallons of water from Mahoning River every 24 hours. There will be a brick building of large proportions that will be used for making and repairing ladles, converting bottoms, &c. Eight 250 horse-power water-tube boilers will be required, with mechanical stokers and smoke consumers.

Furnace No. 2 of the Thomas Iron Company at Hokendauqua, Pa., which has been undergoing repairs for some time, is now ready for blast and will probably resume operations during this month.

The steel plant and plate mill of the Riverside Iron Works at Wheeling, W. Va., which have been undergoing repairs for some time, have again resumed operations.

The Newport Rolling Mill Company of Newport, Ky., are erecting in their plant a battery of ten steel boilers, each 24 feet long, 60 inches in diameter, with 16 6-inch tubes in each. The increased demand experienced by this concern for steel roofing sheets, of which they are large

manufacturers, has made it absolutely necessary for them to considerably increase their capacity.

The Troy Steel & Iron Company, Troy, N. Y., have re-elected the board of trustees, with the exception that John B. Archbold was chosen in place of the late O. B. Jennings, and J. W. Cox in place of C. E. Dudley Tibbitts.

James A. Wright, purchasing agent for the Durango Iron & Steel Company in Mexico, was in Pittsburgh recently for the purpose of buying material and machinery which will be required on account of some extensive improvements being made by that concern.

A statement which originally appeared in the Pittsburgh daily papers, and has since found its way into a number of the trade journals, gives the startling information, that in one day recently there was produced at the Edgar Thomson Steel Works of the Carnegie Steel Company, Limited, 14,040 tons of steel billets. While it is true that the above works have recently made some good records for production of billets, the output in 24 hours has not as yet come up to the above amount by a good many thousand tons, the insertion of an extra cipher being responsible for the error. The output for the day in question was 1404 tons.

Citico Furnace at Chattanooga, Tenn., has resumed operations after an idleness of some weeks.

Last Saturday the officials of the Bethlehem Iron Company at Bethlehem, Pa., received notice that the contract was awarded them for over \$2,000,000 worth of heavy armor plate. The entire contract was \$3,500,000. The Carnegie Works of Pittsburgh were awarded the balance of the contract.

It is reported that a move is on foot by Milwaukee iron dealers and capitalists to establish extensive blast furnaces on the Gogebic Range at Ironwood and Bessemer.

The American Tube & Iron Company, Youngstown, Ohio, are crowded with orders for pipe. This plant is one of the most complete in the United States and the firm is producing the finest pipe on the market.

Summers Bros. Company, at Struthers, Ohio, have been running full time. A number of important changes will be made in these mills during the coming season. A new sheet mill will be built which will be one of the best equipped plants in the valleys.

The Ohio Steel Company of Youngstown have contracted for nearly all the work of erecting and machinery for their immense plant, which will have a capacity of from 1000 to 1400 tons of steel billets per day. It is expected that operations will commence during the close of the year 1893. There will be three cupolas in the cupola house; two 20-ton converters and a 20-ton hydraulic crane in the converting house; 15 soaking pits, a bloom mill, shears, &c., in the mill. In addition to these there is a brick structure, iron roofed, to be used as a machine shop, 82 x 90 feet, fitted with the most modern appliances for heavy and light machine work and repair; a brick engine house containing the flowing engine, hydraulic pumps, feed water pumps, engines for generating electricity for both light and power. The power thus generated will be used for operating large electric traveling cranes, pumps, located at the river. A large cast-iron pipe, about 1500 feet long, through which the general water supply is to flow, has an inside diameter of 20 inches, and will afford the large supply of 4,000,000 gallons of water every 24 hours. A large brick building is to be erected for making and repairing ladles, converting blooms, &c. Eight 250 horse-power water-tube boilers will be required, with mechanical stokers and smoke consumers. Ten gas producers will heat the steel. There will also be constructed two billet mills for taking the steel section from the mill and finishing it to all sizes of billets, sheet bars and tin-plate bars. These billet mills will be constructed with a view ultimately to making all kinds of I-rails. The works will furnish steel billets for all the Mahoning Valley rolling mills, as they nearly all own an interest in the plant. This means that Valley mills will no longer be patrons of the Pittsburgh steel makers. The steel company have erected a large office at the works and will occupy same early this month.

Machinery.

The Aldwood Pulley Company of Pittsburgh have been granted a charter with a capital stock of \$10,000. The stockholders in the new concern are principally Pittsburghers.

The annual meeting of the stockholders of the Union Switch & Signal Company of Pittsburgh will be held in the Westinghouse building in that city on Tuesday, March 14, at 2 p.m.

On Friday, the 24th ult., a charter was granted to the Verona Tool Works of Pitts-

burgh, with a capital stock of \$120,000. The directors are Jacob W. Paul, Henry S. Paul and Harry W. Armstrong. The new concern which succeed to the business is Metcalf, Paul & Co., tool manufacturers, whose plant is located at Verona, on the line of the Allegheny Valley Railroad, about 8 miles from Pittsburgh.

The James E. Thomas Company of Newark, Ohio, have been incorporated with a capital stock of \$30,000. The new concern propose to erect a foundry, boiler shop and blacksmith shop.

An extensive addition is being made to the machine shop of the Peckham Car Truck Works, at Kingston, N. Y., and it is expected that it will be completed in about a month. It will be 80 x 35 feet. As soon as completed a double force of employees will be put in the entire plant, and work will be continued night and day. A new system of electric lighting is also being put in the works. When the full plant is in operation 160 men will be given employment. The company report a prosperous outlook and have all the orders they can fill for some time. During January \$10,000 worth of car trucks were shipped.

The Carnegie Steel Company, Limited, of Pittsburgh, have placed an order with William Todd & Company of Youngstown, Ohio, for the erection of an engine to be placed in the new machine shop now being erected in the armor-plate department of the Homestead Steel Works.

The Miller Foundry Company of Youngstown, Ohio, shipped last week to the Reeves Iron Company of Canal Dover, Ohio, a consignment of sheet-mill rolls 24 x 40 inches in size, and also a shipment of muck rolls to the Pomeroy plant of the Union Iron & Steel Company.

The Rochester, N. Y., Bridge and Iron Works have been awarded the contract for the construction of a wrought-iron bridge over the Western New York & Pennsylvania Railroad at the Bronson avenue crossing, Rochester. The price is \$6516, and the work will be completed in 65 days.

The Malone, N. Y., Foundry & Machine Company have chosen the following directors: J. C. Saunders, M. H. Barry, C. H. Mead, Thomas Hinds and L. C. Mead. The directors elected the following officers: President, J. C. Saunders; treasurer, M. H. Barry; secretary, Thomas Hinds.

The Gloversville, N. Y., Foundry & Machine Company have been dissolved. The plant hereafter will be the exclusive property of the Fonda, Johnstown & Gloversville Railroad Company, managed by the Railroad Board of Directors and operated as heretofore as railroad repair shops and for general jobbing.

The Barr Pumping Engine Company, Philadelphia, have just completed compound condensers for the Frankfort Water Company of Frankfort, Ky., and for the water works at Bridgeton, N. J.

A deal was completed in Beaver Falls, Pa., last week by which the stock in the Union Drawn Steel Company of that place held by the Economy Society was sold to W. A. McCool for \$82,000.

The Robert L. Walker Smokeless Furnace Company of Pittsburgh have recently closed contracts with the Totten & Hogg Iron and Steel Foundry Company of that city to place the Walker smokeless furnace under a 100 horse-power boiler, and they have also received an order from the Carnegie Steel Company, Limited, for this type of furnace to be placed under two two-flue boilers, 26 x 29 feet, and of about 60 horse-power.

Patch & Swift, founders and machinists, of Streator, Ill., are erecting in their foundry department a new steel crane, designed by their superintendent, A. L. Patch. This was made necessary by their increasing business in heavy castings.

The York Mfg. Company of York, Pa., will erect new shops in the spring, and plans have been prepared for the following structures: Boiler house, 140 x 240 feet; foundry, 50 x 180 feet; blacksmith shop, 40 x 80 feet; storage house and office, two stories, 180 x 36 feet; machine shop and erecting room, 80 x 300 feet, pattern and tool house, two stories, 120 x 100 feet, and engine and boiler house, 30 x 80 feet.

The Henderson Machine Tool Company, Philadelphia, have completed for the Pennsylvania Iron Corrugating Company a large press with a power of about 300 tons, for stamping ceiling plates. They have also furnished a seven-roll set of straightening rolls for the manufacturers of the Remington safes, and are at present at work on a double-head shaper for the Pullman Palace Car Company.

The Berlin Iron Bridge Company of East Berlin, Conn., are at work putting up the roof trusses on the new light and power station for the Electric Light & Power Company, at Syracuse, N. Y.

The copartnership formerly existing between Stephen A. Morse, Carlton M. Williams and Edwin F. Morse for the manufacture of elevators, at Philadelphia, under the firm name of Morse, Williams & Co., was dissolved by expiration on August 31 last, since which time Messrs. Williams & E. F. Morse have conducted the business under the same name. This partnership has also been dissolved by mutual consent, and the business will hereafter be conducted by the Morse, Williams & Co., an incorporation created under the laws of Pennsylvania and incorporated on February 16, 1893.

The Skinner Chuck Company of New Britain, Conn., report a large increase in their business for the past year, and the prospects for the present year are very favorable. During the last year the company have been awarded several patents upon improvements. Some of the new machines are already in the market, and others will soon be ready for sale. A new drill chuck which has already had large orders will be first placed upon the market the coming month.

The Harrisburg Boiler & Mfg. Company of Harrisburg, Pa., are moving their plant into their new buildings, and expect to be in running order about the end of this month. They have considerable work on hand, which is not affected by the removal.

The Litchfield Car Mfg. Company of St. Louis may remove their extensive works to Atlanta, Ga., in order to be nearer the source of supplies.

The Deal Lock Company of Akron, Ohio, have been incorporated, with a capital of \$20,000, for the purpose of manufacturing patent combination locks.

Announcement is made in the Chicago papers that the works of the Michigan Peninsular Car Company of Detroit will be removed to West Pullman, a suburb of Chicago, where 50 acres have been set aside for their use, to be almost entirely covered with buildings, side tracks, storage yards for material, &c. The company employ about 5000 men and are said to be the largest manufacturers of freight cars in the world.

Among recent applications for corporation licenses in Illinois are the following: The Adams Electric Mfg. Company, at Chicago; capital stock, \$500,000; for the manufacture of electric machinery and supplies; incorporators, William B. Mather, William L. Sutherland and James S. Wheeler, Jr. The Emlyn Steel & Tin Plate Company, at Chicago; for the manufacture of steel, iron and fine sheets, tin andterne plates; incorporators, John E. Jones, Florian P. Gass and Isaac Bassford. The Perfection Horseshoe Company, at Chicago; capital stock, \$150,000; for the manufacture of horse shoes; incorporators, William Greiner, Jr., E. Winters and A. Jackson. Windsor Company, at Chicago; capital stock, \$100,000; for the manufacture of sewing machines and attachments; incorporators, James A. Windsor, Jr., James A. Windsor and R. J. McQueston. Bailey Mfg. Company, at Chicago; capital stock, \$50,000; for the manufacture of bicycles and machinery; incorporators, Walter G. Gunthorp, J. Elliott and E. T. Wray. The Mechanic's Foundry Company, Rockford; capital stock, \$15,000; incorporators, Levin Faust, G. W. Swan, Benjamin Anderson and Olaf F. Johnson. Corey Steam Pump Company, East St. Louis; capital stock, \$100,000; incorporators, G. N. Scott, W. W. Corey, Jr., and D. Strawbridge.

Miscellaneous.

The deeds in the sale of the Mount Braddock Cole and Coke plant, purchased recently from Robert Hogsett by W. J. Rainey of Cleveland, Ohio, were passed last week. Mr. Rainey has taken possession of the plant and made a first payment of \$75,000. The purchase price is said to have been \$450,000.

The citizens of Salt Lake City, Utah, have subscribed \$100,000 for the purpose of establishing a copper smelter at that place.

The rebuilt United States Screen Factory at West Randolph, Vt., is equipped with the Sturtevant system of heating and ventilating. The heater is a large steel case, 5 x 3 feet, 6 feet high, containing 1800 feet of 1-inch pipe; attached to this heater is a fan, standing 80 inches high, which, as it revolves, draws the cold, fresh air from the outside through the heater and blows the heated air all over the building through large galvanized pipes. By this arrangement the factory can be heated to 60° in the coldest weather and the dry house 120°. The fan is driven by a 5 horse-power Sturtevant engine, which is supplied with steam from the boiler 50 feet away, independent of all other pipe connections, thus enabling the company to use this engine night and day. Inside the main heater is a small section of 1-inch pipe, about 300 feet of which takes the

exhausted steam from small engines, which also helps to warm the cold air before entering the rooms above.

Wage Fluctuations in Germany.

The United States Consul in Cologne, in a recent report, gives an interesting summary of a number of statistics collected by various trade unions on the fluctuations in wages in 906 German cities and 924 unions. The figures show that wages have increased in only seven cities, while they have declined in 229, and have remained stationary in the rest. The machine industry, representing 400 local unions, with 20,000 members, shows only two places in which wages have lately risen; in 72 they have declined, while in the balance they have remained stationary, although the price of food has risen. In all the great centers of the machine industry wages have decreased, such as Aix-la Chapelle, Berlin, Breslau, Dortmund, Dusseldorf, Erfurt, Essen, Leipzig, Magdeburg and Nuremberg. In only 211 out of 906 cities was there full employment, while in 30 there was an almost complete stoppage of work. It is stated, also, that in most parts of Germany to-day the workman alone cannot earn enough to support his family. With a family of four persons the average expenditure appears, from "family budgets" which have been collected, to be about \$260 a year, while the earnings of the head of the family alone amount to only \$194.

The large export movement of specie from this country now taking place, in addition to extraordinary exports of merchandise, in order to balance our foreign trade account, is ascribed by ex-Shipping Commissioner Bates to the enormous amount of freight charges paid for the employment of foreign ships. Mr. Bates estimates that shipping charges amount to an average of 15 per cent. on the valuation of the merchandise carried. At this rate there was charged against us on the 87.7 per cent. of our imports and exports carried in foreign bottoms last year, \$235,000,000. Our own vessels earned on the 12.3 per cent. carried by them, \$33,000,000, leaving a balance against us, to be set off against the balance in our favor on the merchandise account of \$202,000,000. This is almost exactly the amount by which our last year's exports exceeded imports of merchandise.

The Southern Iron Company of Nashville, Tenn., have secured control of the old Cumberland iron blast furnace in Dickson County. It is stated that the furnace will be put in operation within the next six or eight weeks. It will have one of the richest ore beds in the South.

The new furnace at Covington, Va., is completed, and as soon as the railroad to the mines is finished the furnace will go into blast. It is stated it will only require about 60 days.

Philadelphia merchants claim that the "stop off" tickets now furnished to Western buyers by the railroads are of great advantage, as "delegations of merchants" bound to New York are intercepted and prove to be good customers.

Jacob S. Rogers, the owner and president of the Rogers Locomotive Works, has retired from active management of the business. The business will be carried on under the name of the Rogers Locomotive Company, with a capital stock of \$3,000,000. Robert S. Hughes, formerly secretary, will be president of the new company.

The world's maritime convention at London calls for American inventions.

TRADE REPORT.

Chicago.

(By Telegraph.)

Office of *The Iron Age*, 59 Dearborn street, }
CHICAGO, March 1, 1893.

Pig Iron.—Local Coke Iron is still moving quite freely, with additional business in sight. The very large sales made within the past six weeks have put the manufacturers here in very good condition. The business of February is stated to have been the largest ever done in this city in one month. Consumers are generally realizing that prices are as low as they can expect them to go and orders for long deliveries have been more frequent of late than for two or three years past. Cases are frequent in which purchases have been doubled after the situation had been carefully pondered. The more satisfactory condition of the makers has led to a slight improvement in prices and changes are therefore made in our quotations to correspond with the firmer feeling. A better trade is reported in Southern Coke, the buying being more general. Large contracts are not numerous, the orders running for moderate lots for comparatively short deliveries. No further cuts are reported in prices by the leading Southern companies, but the market can hardly be called strong. The competition for business has thus far been confined to the smaller companies and it remains to be seen how long the larger ones will refrain from pressing their attention on consumers. Lake Superior Charcoal is quiet but firm. Quotations are as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal	\$16.50 @ \$17.00
Local Coke Foundry, No. 1	13.25 @ 13.75
Local Coke Foundry, No. 2	13.00 @ 13.25
Local Coke Foundry, No. 3	12.75 @ 13.00
Local Scotch	14.00 @ 14.50
Ohio Strong Softeners	16.25 @ 17.00
Southern Coke, No. 2	13.35 @ 13.60
Southern Coke, No. 3	12.85 @ 13.10
Southern, No. 1, Soft	13.35 @ 13.60
Southern, No. 2, Soft	12.85 @ 13.10
Southern Gray Forge	12.60 @ 12.90
Southern Mottled	12.50 @ 12.75
Tennessee Charcoal, No. 1	16.50 @ 17.50
Alabama Car Wheel	18.35 @ 19.85
Coke Bessemer	14.00 @ 14.50
Hocking Valley, No. 1	17.00 @ 17.50
Jackson County Silvery	17.00 @ 17.50

Bars—The market is in about the same condition as last week, with the tendency rather in favor of manufacturers than otherwise. A considerable movement is in progress and some sales have actually been made at 1.45¢, Valley mills, equal to 1.60¢, Chicago, half extras, for Common Iron. Buyers who shop vigorously are, of course, able to do better than this, but it takes a very good specification to get down to 1.55¢ in a regular way. Car orders are coming up again, and, while buyers profess to have very low quotations on this class of Iron, the manufacturers talk otherwise. Shipments on contracts are not being made promptly, the best mills being among the slowest, showing that they are for the time being full of work. Soft Steel Bars are in good demand, with prices ranging as before at 1.65¢, Chicago, and upward, according to the seller. Store prices continue at 1.70¢ @ 1.80¢ for Bar Iron and 1.80¢ @ 1.90¢ for Soft Steel.

Structural Material.—Business in Beams has been rather light for some time, owing to the disposition of consumers to hold off for lower prices. They appear to have the impression that manufacturers are, or shortly will be, eager for business, and that the bottom of the market has not been reached. Manufacturers say that the only way they can speedily settle this question is by slightly advancing prices, but it is a question as to whether all of them would agree on this course. Mill

orders, Chicago delivery, are quoted as follows: Beams, 2¢ @ 2.10¢; Angles and Universal Plates, 1.85¢ @ 1.95¢.

Plates.—Business is hardly as active as it was. Prices are no lower than they have been, and mill representatives state that their principals are now quite indifferent as to whether they get new orders or not. Prices now current are claimed to represent actual cost or below it, and manufacturers think they can take their chances for the future as well as the consumers. The 6500-ton contract for Light Plates for riveted pipe for Portland, Ore., is to be placed this week. This order is part of a very heavy purchase on account of the Portland Water Works, which will cover, in addition, 28,500 tons of Cast-Iron Pipe. Boiler Tubes are nominally 65% off, but the price is not being maintained. Quotations on mill shipment, Chicago delivery, are as follows, for carload lots: Tank Steel, 1.90¢ @ 2¢; Sheet Steel, 2.10¢ @ 2.15¢; Flange Steel, 2.27¢ @ 2.30¢; Ordinary Fire Box, 3.50¢. Store prices continue as follows: Nos. 10 to 14 Iron or Steel Sheets, 2.35¢ @ 2.60¢; Tank Steel, 2.25¢ @ 2.40¢; Shell, 2.40¢ @ 2.60¢; Flange Steel, 2.70¢ @ 2.90¢.

Sheets.—Some of the outside jobbers are in the market for Light Sheets, but it is rather early for much of a movement in the direction. Roofers are buying to some extent, but most of the large roofing concerns have contracted for their material up to July 1. Prices for Black Sheets are still quoted at 2.85¢, Chicago, for No. 27 Common and 3¢ for Steel, with some mills shading the Steel price. A good trade is reported in Galvanized Iron, but the price has not stiffened, continuing at 70 and 10% off, Juniata, on mill shipments and 70 and 2½% from stock. A contract for train sheds for the World's Fair will require 30 tons of Galvanized Iron. It was secured by James A. Miller & Bro. of Chicago. Sheet Copper is unchanged at 30% discount for small lots from stock.

Merchant Steel.—This is the period between seasons, and manufacturers are now compelled to be content with a light demand from consumers who find themselves in need of small lots to piece out contracts. They are looking forward to an early movement among the implement manufacturers, who they hope will continue the policy of previous years by entering the market early for their material for the next manufacturing year. It is possible that this month may see the beginning of such contracts. Open-Hearth Machinery and Spring Steel are steady at 2¢ @ 2.20¢, Chicago, for mill shipment. Ordinary Tool Steel is selling at 6¢ @ 7¢, according to quantity, and Special sells at 12¢ and upward.

Billets.—Prices are firm at \$25, Chicago, for Steel Billets, March and April delivery, for anything which can be obtained from stock on hand, as the local mills are not running. The heavy consumption of Steel by those who lately made a great deal of Iron is having its effect on this class of material and firm prices are expected during at least the next two months. Nothing is doing here in Wire Rods; local consumers are well supplied, their wants probably being covered to July.

Rails and Track Supplies.—No change has occurred in the Rail situation. The local makers are now assured of a very satisfactory tonnage, and take a cheerful view of the outlook for the coming season. Prices are firmly maintained at \$30 @ \$32, according to quantity. Splice Bars are quoted at 1.65¢ @ 1.70¢ for Iron and Steel. Track Bolts with Hexagon Nuts, 2.60¢ @ 2.65¢; Spikes, 2¢ @ 2.05¢.

Old Rails and Car Wheels.—Old Iron Rails are quiet, holders refusing to accept offers of \$18.50. Old Steel Rails

are affected by the advance in freight to Eastern consuming points and are only nominally quoted at \$11.50 for short pieces and \$14.50 @ \$15 for long lengths. Car Wheels are steady at \$14.50 @ \$14.75, with holders endeavoring to work the market up to better prices, which buyers are resisting.

Scrap.—The past week has been extremely dull. A weak feeling is apparent among the dealers, which is particularly noticeable in high class Wrought. Dealers quote as follows per net ton: No. 1 Forge, \$15; No. 1 Mill, \$11; Sheet Iron, \$6; Pipes and Flues, \$10; Axles, \$20; Horseshoes, \$15.50; Fish Plates, \$17; Spikes and Bolts, \$15; Cast Borings, \$6; Wrought Turnings, \$8.25; Axle Turnings, \$10.50; Heavy Cast, \$11.25; Stove Plate, \$8.50 @ \$9; Malleable Cast, \$10; Mixed Steel, \$10 @ \$10.50, gross ton; Leaf Steel, \$17.75.

Metals.—Copper is unchanged at 12½¢ for Lake and 11½¢ for Casting brands in carload lots. Spelter is still quiet, with 4.10¢ as the nominal price on carload lots. Pig Lead is stationary at 3.75¢, with only light sales reported.

Freight Rates.—Freight rates to Chicago on carload lots of Iron and Steel from principal outside sources of supply:

<i>Pig Iron.</i>	Ton.
Birmingham, Ala.	\$3.85
Chattanooga, Tenn.	3.60
South Pittsburgh	3.47
Cowan	3.23
Ashland, Wis.	2.75
Mahoning Valley, Ohio	2.00
Southern Ohio	2.00
Western Wisconsin	1.50
Central Wisconsin	1.15

<i>Billets.</i>	
Pittsburgh, Pa.	\$2.75

<i>Finished Iron and Steel, Nails, Barb Wire, &c.</i>	100 pounds.
Eastern Pennsylvania	\$0.28
Superior, Wis.	.22
Pittsburgh, Pa.	.17½
Ohio River points	.17½
Youngstown, Ohio	.15
Cleveland, Ohio	.14
Canal Dover, Ohio	.14
Toledo and Findlay, Ohio	.12
Muskegon, Mich.	.11
Muncie, Ind.	.11
Peoria, Ill.	.08
Springfield, Ill.	.05

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., }
PHILADELPHIA, Pa., February 28, 1893.

The close of the second month of the year finds the Iron market in much the same condition as during the last month of the preceding year. All the business that had been figured on has become actual orders in hand, and yet there is extreme depression. It is difficult to account for this feeling, as the volume of business is large, larger probably than at any previous time; the only rational explanation seems to be that the capacity for production has increased even more rapidly than consumption. The shipyards never had so much work in hand; the locomotive works are running full time with over 4500 hands; bridge builders are doing well; the large engineering and machine shops are working to full capacity; manufacturers of saws, files and hardware specialties are doing their full share, while the stove and heating trades never had so large a business, and yet complaints of unremunerative business are met with on every hand. Improved methods of construction and manufacture have done much to increase the producing capacity and to cheapen cost, but there are so many complaints that there must be some basis of truth in the claim that prices are too low, and if there is, it is hard to see how to get

around it. The only chance for any radical improvement in the Iron and Steel trades is a heavy demand for Rails, and of that there is no immediate prospect, and, as a matter of fact, such a movement in large proportions is not likely to occur until conditions change very materially. With a capacity of from three to four million tons per annum, there is no reason to apprehend scarcity at any time within sight, consequently the roads only order such lots as are required from month to month. Hence, while there are no great spurts of activity, neither are there any periods of very serious depression, and for these reasons no very extraordinary demand for Rails is figured on. The development of the electric railroad systems may help the mills out, and some hopes are entertained of an export trade, but both of these factors, if we may use the expression, are at present in the future. The Maryland Steel Company are well situated for a business of that kind and are now working on a 4000-ton order for Cuba.

To summarize the entire position, however, it may be said that there is plenty of business, but it is done at unremunerative prices, due to too rapid an expansion of productive capacity.

Financial disturbances in the Schuylkill Valley have imparted a gloomy feeling in the neighborhood, and will probably have a tendency to restrict business for some time to come. Credits are carefully scanned, and until the flurry is over it is unlikely that any very extensive operations will be undertaken.

The latest information is that E. A. Ballard and Joseph H. Cofrode have been appointed receivers for the Reading Rolling Mill Company, and that work will be continued as usual, with fair prospects of one hundred cents on the dollar being realized.

The firm of J. F. Bailey & Sons have suspended payment, owing to heavy indorsements for the Rolling Mill and Bridge Works. Apart from this, the firm are in perfectly good condition, but pending some understanding in regard to the indorsements it was thought best to suspend payment.

Pig Iron.—Prices have not changed either for better or worse. There is a full supply of Iron of one kind or another, and for the kind that is not specially wanted prices are inclined to be weak and irregular. Standard brands are well taken care of, and holders have no difficulty in sustaining prices, and to that extent the market may be called steady; but the feeling is not sanguine, and sellers seem to think they are doing pretty well to stave off concessions. The Ore question is one of considerable importance at this juncture, and a decided movement in that direction would be quickly responded to in Pig Metal. For the present, however, the market is a waiting one, and until something occurs to give it a new turn the range of prices will probably be as follows for Philadelphia and equivalent deliveries, with 25¢ to 50¢ less on Southern brands at Harrisburg and intermediately to Baltimore:

American Scotch, No. 1X.....	\$17.00 @	\$17.25
American Scotch, No. 2X.....	16.00 @	16.25
Standard Penna. (Lake Ore), No. 1X.....	14.75 @	15.25
Standard Penna. (Lake Ore), No. 2X.....	14.25 @	14.50
Standard Virginia, No. 1X.....	14.75 @	15.00
Standard Virginia, No. 2X.....	14.00 @	14.25
Virginia and Southern, No. 1X.....	14.00 @	14.50
Soft.....	14.00 @	14.50
Virginia and Southern, No. 2X.....	13.25 @	13.50
Standard Penna. and Virginia Forge.....	13.00 @	13.25
Ordinary Forge.....	12.50 @	12.75

Bessemer Pig.—A fair demand is reported, but there is quite a disparity in prices. Some brands are quoted at about \$15.50 @ \$15.75, delivered, while others of a higher standard command \$16 @

\$16.25. Price depends altogether on the analysis, but the range is about as we have stated, say \$15.50 @ \$16.25, delivered.

Steel Rails.—Market steady with fair demand at \$29, f. o. b. cars mills. There is no change in prices, and nothing in the outlook to indicate any special movement in either direction. There is a good deal of business on hand for March, April and May deliveries, but no recent orders have been given out except for small and medium sized lots, although there is some talk of orders waiting for quick deliveries, which some of the mills are not prepared to meet.

Steel Billets.—Makers still quote pretty firm figures, say \$24, delivered, for Western, and \$24.50 @ \$25 for Eastern Steel. Buyers are in the market for good-sized lots at about 50 cents below these figures, but very little business has been done, as neither side seems disposed to make a concession. On the whole the feeling appears to be firmer than it was two or three weeks ago, with the chances rather in favor of the selling interests, as stocks in consumers' yards are pretty well run down.

Bars.—The market is very dull and, although prices are at the lowest ever reached, it is difficult to do business without making still further concessions, as every mill seems to either want work or be afraid that they will want it before long. Nominal quotations are 1.65¢ @ 1.70¢ for Best Refined Bars, city deliveries, but buyers claim to have still better figures given them, while at interior points 1.60¢ is regarded as a full price, and as low as 1.50¢ for what is claimed to be a good quality of Iron. Steel Bars sell all the way from 1.70¢ @ 2¢, according to requirements as to quality.

Skelp.—Mills manage to keep pretty well employed, but at distressingly low figures. Nominal prices for Grooved are 1.55¢ to 1.57½¢, delivered, but on large lots the inside figure has been shaded in several recent transactions, with nothing to indicate any immediate improvement.

Plates.—The feeling is better than in some other departments, and mills are kept pretty well employed, but prices are terribly demoralized. Sales have been made at 1.75¢, delivered for Ship Plates, and while some hold for 1.80¢ to 1.85¢, there are plenty of others ready to accept lower figures. Similar reductions have been made in the higher qualities, and wherever a buyer can be found with a good-sized order special rates are at once named. Nominal prices, delivered, are about as follows for small lots:

	Iron.	Steel.
Tank Plates.....	1.80 @ 1.85¢	1.80 @ 1.85¢
Shell.....	2.00 @ 2.10¢	2.00 @ 2.10¢
Flange.....	2.70 @ 2.90¢	2.30 @ 2.40¢
Fire Box.....	3.00 @ 4.00¢	2.50 @ 2.70¢
Special qualities.....	3.25 @ 3.75¢	3.25 @ 3.75¢

Structural Material.—The recent shaking up in the Schuylkill Valley has caused an unsettled feeling, but there is no reason to suppose that it makes any actual change in the situation. The works will be kept in operation in charge of receivers, and contracts completed same as they would have been under the former management. There is not much new work coming in at present, but there is plenty to go on with, and very fair prospects for its continuance during the spring and summer months. Prices are irregular, but for the general run of business quotations range about as follows, delivered: Beams, Channels or Tees, 2¢ @ 2.20¢, according to size of order; Angles, 1.80¢ @ 1.90¢; Universal Plates, 1.85¢ @ 1.90¢

Sheets.—There is a pretty good demand, but prices are very much demoralized, making it almost impossible to secure any decent-sized order without making sharp

concessions. Some makes are obtainable at materially lower figures, but the best qualities are quoted about as follows for small lots:

Best Refined, Nos. 14 to 20.....	2.75¢ @ 2.85¢
Best Refined, Nos. 21 to 24.....	2.90¢ @ 3.00¢
Best Refined, Nos. 25 to 26.....	3.15¢ @ 3.20¢
Best Refined, No. 27.....	3.30¢ @ 3.40¢
Best Refined, No. 28.....	3.40¢ @ 3.50¢

Common, ½¢ less than the above.

Quotations given as follows are for the best Open-Hearth Steel, ordinary Bessemer being about ¼¢ lower than are here named:

Best Soft Steel, Nos. 14 to 16.....	2½¢ @ 2½¢
Best Soft Steel, Nos. 18 to 20.....	3¢ @ 3½¢
Best Soft Steel, Nos. 21 to 24.....	3½¢ @ 3½¢
Best Soft Steel, Nos. 25 to 26.....	3½¢ @ 3½¢
Best Soft Steel, Nos. 27 to 28.....	3½¢ @ 4¢

Best Bloom Sheets, ½¢ extra over the above prices.

Best Bloom, Galvanized, discount.... 70 and 5 %

Old Material.—Prices are unchanged, as there is a fair demand for the various kinds of Old Material. Steel Scrap is particularly active, and appears to be freely taken at last week's figures, which are about as follows: Old Iron Rails, \$18 @ \$19, delivered; Old Street Rails, \$20 @ \$20.50; Old Steel Rails, \$15 @ \$16; No. 1 Railroad Scrap, \$15.50 @ \$16, Philadelphia, or for deliveries at mills in the interior, \$16 @ \$16.50, according to distance and quality; \$8 @ \$9 for No. 2 Light; \$11 @ \$12 for Machinery Scrap; \$11.75 @ \$12.25 for Wrought Turnings; \$8 for Cast Borings, and nominally \$22 for Old Fish Plates, and \$13 @ \$14 for Old Car Wheels.

Wrought-Iron Pipe.—There is a very good demand for Pipe, but prices are irregular and as unsatisfactory as ever. Nominal discounts about as follows, with 5 to 10 extra on desirable orders: Butt, Black, 57½ %; Butt, Galvanized, 50 %; Lap, Black, 67½ %; Lap, Galvanized, 57½ %; Boiler Tubes, 67½ %, all sizes, new list; Casing, 62½ %, new list.

The Bristol Mill plant, which was valued at \$80,000, was sold on February 24 by the assignee, A. Weir Gilkeson, to L. & R. Wister & Co., iron brokers of Philadelphia, for \$22,175. The firm also purchased nearly all of the 1000 tons of scrap iron. It is likely that the mills will now soon resume operations.

St. Louis.

(By Telegraph.)

Office of The Iron Age,
Bank of Commerce Building,
St. Louis, March 1, 1893.

Pig Iron.—The market continues to show additional weakness, and it now seems impossible to predict when the downward tendency will be checked. Each sale reported seems to have been made at a shade lower than the previous one, and, in the absence of any large buying, the market is in a position to be forced down even lower. As an evidence of the voracious appetite of the furnaces, the placing of an order for 1000 tons of No. 1 Soft and Gray Forge by a car works last week is an indication. To secure this order, nine agents offered their figures, and, of course, the lowest-priced Iron was ordered. It is claimed that the price at which the Iron was bought was the lowest yet made, and in consideration of the fact that nine agents were after the business, it can readily be believed that no fancy price was obtained. It is difficult to see anything very encouraging in the future, and it now looks as if prices will make a record that has never yet been reached. We quote as follows for cash, f. o. b. cars St. Louis:

Southern Coke, No. 1 Foundry, \$13.75 @	\$14.25
Southern Coke, No. 2 Foundry, 12.50 @	12.75
Southern Coke, No. 3 Foundry, 12.00 @	12.35

Southern Gray Forge.....	\$11.50 @ \$11.75
Southern Car Wheel.....	18.25 @ 19.00
Lake Superior Car Wheel.....	17.00 @ 17.50
Ohio Softeners.....	16.25 @ 17.00
Missouri Charcoal, No. 1 Foundry.....	13.50 @ 14.00

Bar Iron.—The market for Bar Iron is in an unsettled condition, so far as prices are concerned. The volume of business is fairly satisfactory, but as above stated, prices are unsettled. Mills quote 1.57½¢ @ 1.60¢, and in some cases accept 1.55¢. Spring trade promises to be large, and prices may shortly stiffen.

Barb Wire.—The demand for Barbed Wire is excellent, and in some cases mills are unable to make anything like prompt shipments, especially on Painted Hog. Prices are a trifle stronger. Mills quote Painted at \$2.20 for carload quantities; Galvanized, \$2.60. Jobbers report a good trade.

Wire Nails.—Continued improvement is noted in the demand for Wire Nails and prices are a trifle stronger than last reported. Mills claim to be holding firm at \$1.65 for carload lots to jobbers. Jobbers ask \$1.75 to \$1.80, according to quantity.

Pig Lead.—The demand for this metal is not particularly heavy, and yet at the same time there are no large amounts offered for sale. Sales during the past few days were made at 3.65¢, and offerings are limited at from that figure to 3.67½¢.

Spelter.—There is no change to report in Spelter. The demand is light at 3.95¢, and offerings for March and April delivery are limited at that figure. The price of Ores is advancing, and, should they continue to do so, some of the short sales made at 4.10¢ may not prove to be very profitable deals.

Freight Rates.

Pig Iron.	Per ton.
Birmingham, Ala., to St. Louis.....	\$3.25
Chattanooga, Tenn., to St. Louis.....	3.00
Sheffield, Ala., to St. Louis.....	2.80
Barb Wire and Wire Nails.	Per cwt.
Pittsburgh, Pa., to St. Louis.....	22¢
Cleveland, Ohio, to St. Louis.....	18¢
Anderson, Ohio, to St. Louis.....	14¢

Baltimore.

BALTIMORE, February 28, 1893.

It is doubtful whether there is any section of the country in which the condition of the weather has more effect on trade than in the section tributary to this city. Last week in this report grounds were given for a hope that slightly better things were in store for the trade, but the snow of the latter part of last week crushed all hopes and business is where it was in January. Suicidal cutting in prices on Horse-shoe Iron has been started by some of the smaller dealers here, and that market is in as bad a condition as possible.

Bars.—Orders except from stock are few and far between, and we can only quote our prices of last week. From store, 1.85¢ to 2¢; from mill, 1.80¢ to 1.85¢.

Plates.—Little Plate work of any kind, except for repairs, has been on the market, and prices are still as last named: Tank Iron and Steel, 1.85¢ @ 1.95¢; Shell Steel, 2.20¢ @ 2.25¢; Flange Steel, 2.40¢ @ 2.45¢; Fire Box Steel, 2.55¢ @ 2.60¢; Marine Steel, 2.55¢ @ 2.60¢.

Merchant Steel.—Some few orders for small lots have been placed and quotations still carry the slight advance noted last week: Machinery Steel, 2.17½¢ @ 2.30¢; Tire Steel, 2.20¢ @ 2.25¢; Toe Calk, 2.35¢ @ 2.45¢; Spring Steel, 2.50¢ @ 2.60¢.

Light Sheets.—There has been a general lowering of prices during the last week, due to the fact that mills are quoting lower prices to consumers than heretofore.

Little is moving in this line even at the reduced prices.

Tubes and Pipe.—Our quotations as last made still apply: 3-inch, 65 %; 2-inch, 60 %, from store. From mill 5 % additional.

Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fifth and Main Sts., CINCINNATI, March 1, 1893.

There has been an increased volume of business during the week, but otherwise there is no new feature to the Iron market. In addition to the usual current consumptive demand, running from one car load up to 500 tons, there have been sales of 3000 and 5000 tons of Gray Forge and 3000 tons of No. 3 Foundry, for delivery three to four months ahead, and, while the prices were not made public, it is pretty certain that they were on the basis of current prices, or that only slight concessions were made. It is pretty generally understood that this is a buyers' market, for the offerings of Southern Iron are abundant, far in excess of the quantity taken by buyers, especially of No. 2 Foundry, which has to bear the brunt of the competition of the Northern furnaces which make Iron that can be used in its stead. It is gratifying to see that No. 3 Foundry is moving, if it is at low prices, for it has long been neglected. There is little doing in Charcoal Iron, but consumption goes on all the same, for there are liberal deliveries on previous contracts. A good sign that Iron is wanted is that most of the sales for current consumption are with the promise that the deliveries shall be prompt, and there are urgent appeals to have Iron promptly delivered on previous contracts. Quotations are as follows:

	Foundry.	
Southern Coke, No. 1.....	\$13.25 @ \$13.50	
Southern Coke, No. 2.....	12.00 @ 12.25	
Southern Coke, No. 3.....	11.25 @ 11.50	
Ohio Soft Stone Coal, No. 1.....	16.00 @ 16.25	
Ohio Soft Stone Coal, No. 2.....	15.00 @ 15.25	
Mahoning and Shenango Valley.....	14.75 @ 15.00	
Hanging Rock Charcoal, No. 1.....	19.00 @ 19.25	
Hanging Rock Charcoal, No. 2.....	18.00 @ 18.50	
Tennessee and Alabama Charcoal, No. 1.....	15.50 @ 15.75	
Tennessee and Alabama Charcoal, No. 2.....	14.50 @ 14.75	
	Forge.	
Gray Forge.....	11.00 @ 11.25	
Mottled Neutral Coke.....	10.75 @ 11.00	
	Car Wheel and Malleable Irons.	
Standard Southern Car Wheel.....	18.00 @ 19.00	
Lake Superior Car Wheel and Malleable.....	17.75 @ 18.00	

Pittsburgh.

Office of *The Iron Age*, Hamilton Building, PITTSBURGH, February 28, 1893.

The month of February in point of volume of business showed considerable improvement over January. Prices, too, on some lines of both raw and finished material were better during the month just closing than in January. Bessemer Pig, which sold down to \$13, Pittsburgh, in January, sold up to \$13.60 in February, although it is obtainable now at less than the last-named figure. Steel is in fairly good demand and for prompt shipment has sold up to \$22.15, Pittsburgh, an advance of about \$1 per ton over lowest price in January. Structural Material, Plates, Bars and Wire Nails are in better demand, without any better prices, except on Wire Nails. Pipes and Tubes are in fair demand, but prices are somewhat demoralized. Taken as a whole, the condition of business as we find it on March 1 is fairly satisfactory as far as demand is concerned, and while prices have improved in some directions there is much room yet for further betterments.

Pig Iron.—Inquiries for Bessemer Iron have fallen off considerably within the

past week or two, and buying has again assumed the hand-to-mouth character which prevailed so largely before the sharp advance came in the middle of February. The principal reason for the falling off in demand is the fact that several large Steel makers in this vicinity, and one or two in the Wheeling district, who came into the market at about the same time as buyers of metal, have satisfied their requirements and may possibly be sellers before long. In regard to the future, the impression prevails that prices are not likely to go higher for a time, in view of the limited demand, and also on account of reports of sales of Ore at even lower prices than prevailed during the latter part of 1892. Production has been increased to some extent by the blowing in of several furnaces in this city during the month. Gray Forge is probably in better demand now than at any time during this year, and the established price of \$12.25, Pittsburgh, is being maintained. While some furnaces are refusing to sell Bessemer below \$13.50, Pittsburgh, it is admitted that this price would be shaded under favorable conditions. We quote as follows:

Neutral Gray Forge.....	\$12.25 @ cash.
Au-Ore Mill.....	12.50 @ "
No. 1 Foundry.....	13.75 @ \$14.00, "
No. 2 Foundry.....	12.75 @ 13.00, "
Charcoal Foundry No. 1.....	17.00 @ 18.00, "
Charcoal Foundry No. 2.....	16.50 @ 17.00, "
Bessemer Pig.....	13.40 @ 13.50, "

[We note a sale of 500 tons of Gray Forge at \$12.25, Pittsburgh, and 2000 tons of Bessemer for March and April at \$13.40, Pittsburgh.

Billets.—There is a fair demand for Steel for prompt shipment, and the supply being somewhat scarce, good prices are being obtained. Within the past week several lots of Steel for prompt delivery have been sold at prices ranging from \$21.85 @ \$22.15 at maker's mill. As a rule, makers in this city and also in the Wheeling district are well fixed with business, and are not inclined to meet the views of buyers as to prices of Steel for the second quarter of the year. The fact is pointed out that with the opening of spring trade a considerable increase in demand will result, and, while it is impossible to forecast the future of the market, makers have evidently decided to take the risk, and hold off booking orders for a time at least. About the middle of February two contracts were placed for about 7500 tons of Rod Billets for April, May and June delivery at a price which netted the makers slightly less than \$21.50, also 500 tons for March delivery at a price equal to \$21.75 at mill.

Bars.—While the volume of business has improved considerably and prices to some extent are better, there is still considerable room for improvement in both directions. However, the indications for the future as regards demand are very encouraging, and a heavier consumption will, no doubt, result in better prices. Already some extremely low quotations have been withdrawn both by mills in this city and in the Mahoning Valley. We quote No. 1 Bars at 1.57½¢ @ 1.60¢, and Soft Steel Bars at 1.60¢ @ 1.65¢. In the Mahoning Valley Bars are held at 1.45¢ @ 1.50¢, half extras, with some mills refusing to sell at less than the last-named figure.

Ferromanganese.—Consumers are buying only for immediate wants, and as a result only a moderate amount of material is being sold. Prices are unchanged and we continue to quote \$59, f.o.b. cars Pittsburgh, for 80 %. No foreign material has been sold in this market for some time.

Steel Plates.—Business during February was exceedingly satisfactory as far as tonnage is concerned, but considerable complaint is being heard on account of ex-

tremely low prices at which a number of large contracts were taken. The Carnegie Steel Company, Limited, and the Carbon Steel Company have booked very largely, principally for ship work. The Carbon Steel Company finished up during February several large orders for the new vessels for the United States Navy, and are at present engaged in rolling nickel steel protective deck plates for "Cruiser 13," which is being built by the Wm. Cramp & Sons' Ship and Engine Building Company of Philadelphia. They have also been awarded the contract for all the Steel work on the new battle ship "Iowa," and the armored cruiser "Brooklyn." This makes five vessels in all for which they have or will have furnished the material, the last five let by the Government. In addition they have received a contract from the Cramps for the Boiler Steel for three of the four large vessels to be built for the National Steamship Line and to correspond to the "New York" and "Paris." Although a large increase in tonnage is reported, prices have not shown any improvement. We quote as follows: Ordinary Fire Box, 2.50¢ @ 2.75¢; Best Quality, 3.10¢ @ 3.25¢; Flange, 2¢ @ 2.10¢; Tank, 1.67½¢ @ 1.70¢; Shell, 1.85¢ @ 1.95¢; Universal Bridge Plates, 1.75¢ @ 1.80¢.

Steel Rails.—A fair tonnage is being received, and considerable business for Western roads is in sight, a part of which is expected to be closed during this month. Prices are unchanged at \$29, f.o.b. at mill, for Standard sections. Edgar Thomson continues on Rails.

Structural Material.—A very considerable increase in volume of business is reported, and a very heavy trade is expected as soon as the weather opens up sufficiently to permit building operations. As we have before pointed out, the indications are that the demand for Structural Material of the various kinds will undoubtedly be heavier this year than ever before. The prices at which it can be obtained today, contrasted to those prevailing a year ago, are largely in favor of the consumer. Owners of new buildings will hardly fail to realize that their best interests will be served by substituting Iron or Steel in place of wood. This, of course, will very materially increase the demand, and a large volume of business will undoubtedly be the result, or makers will be very much disappointed. For ordinary lots, prices are ruling as follows: Beams and Channels, 1.80¢ @ 1.90¢, f.o.b. Pittsburgh; Angles, 1.70¢ @ 1.75¢; Z Bars, 1.90¢; Tees, 2¢ @ 2.10¢.

Wire Rods.—Very little improvement has taken place either as regards demand or prices, although we are advised that some extremely low quotations have been withdrawn from the market. One concern in this vicinity advise us that they have a fair amount of business on hand and are not inclined to meet some of the extremely low quotations that have been made. We continue to quote at \$29.50, Pittsburgh, and it is possible that a desirable order would slightly shade this price.

Muck Bars.—Demand continues quiet and very little material is changing hands. We are advised of a sale of 200 tons recently on a basis of \$24.25 for No. 1 Muck Bars, delivered at buyer's mill, which can be considered as the price ruling in this market.

Sheets.—Quite a number of season contracts have been placed and negotiations between buyers and makers point to the closing of some contracts in the near future. One concern in this city is about ready to place a good-sized order for Sheets, which will probably be done within

the next week or two. While it is intimated that for large blocks prices quoted below have been shaded to some extent, prices given about represent what is being obtained for ordinary run of orders. We continue to quote Ordinary Box Annealed Sheets, No. 24, 2.50¢ @ 2.55¢; No. 26, 2.60¢ @ 2.65¢; No. 27, 2.70¢ @ 2.75¢. For Soft Steel Sheets some mills charge a slight advance on above prices.

Pipes and Tubes.—For some time past no attention whatever has been given by makers to official discounts, the market being an open one, and makers named whatever prices they saw fit. A fair amount of orders is being placed, and an improved consumption will, no doubt, shortly occur, as within a short time the weather will be such as will permit outside pipe laying.

Wire.—Considerable activity prevails, and a large amount of business has been placed within the last month, nearly all, of course, for spring delivery. All indications at this time point to a heavy consumption of Plain and Barb Wire during this year, and makers expect that the demand will be much heavier than in any one year in the history of the trade. Prices are firm, and in some instances slight advances are being obtained. We quote Painted Barb Wire at 2¢ and 2.05¢, and Galvanized at 2.40¢ @ 2.45¢, f.o.b. cars at makers' mill, in carload lots.

Wire and Cut Nails.—At a meeting of the Western Wire Nail manufacturers held in the Weddell House, Cleveland, Ohio, last week a slight advance in prices was decided upon, to go into effect at once. Makers state that in view of the heavy demand at present it is confidently expected that this advance can be maintained. We quote Wire Nails on a basis of \$1.45, Pittsburgh, and \$1.50, Cleveland, in carload lots. The new card recently adopted by Cut Nail manufacturers at Pittsburgh has been favorably received by the trade, and interviews with jobbers indicate that the opinion prevails that if the new card is observed, it will be of considerable benefit to the Cut Nail trade. Quite a material improvement in the demand for Cut Nails has taken place within the last month, and the mills in the Wheeling district are better fixed with orders than for some time past.

Scrap Iron and Steel.—February was an exceedingly dull month in Scrap circles and very little material was sold. One reason for this was the fact that during the greater part of the month railroads were tied up on account of heavy snows and unable to make deliveries. However, mills were not inconvenienced to any extent, as the demand for Scrap material of all kinds seemed to be growing less right along. Prices continue weak, and we quote No. 1 Railroad Wrought Scrap at \$14.50 ¢ net ton; Cast Iron Borings, \$7.25 ¢ gross ton; Leaf Springs are very scarce and almost impossible to obtain, and as a consequence prices have advanced sharply, and we now quote these at \$21 ¢ gross ton; Coil Springs are dull and are worth about \$17.50 ¢ gross ton; Old Car Axles are offered freely at \$12.50 ¢ gross ton; Railroad Cast Scrap we quote at \$11.25 @ \$11.50 ¢ gross ton, and note a sale of 250 tons at first-named price.

Old Rails.—No business is being done and nothing but nominal quotations can be given. Steel Rails, short lengths, may be quoted at \$15.50 ¢ gross ton; long lengths, \$15, and miscellaneous, \$15. Iron Rails are in moderate demand and offers of delivery in the Mahoning Valley at \$20.50 ¢ gross ton have been declined in several cases. It is not thought that above \$19.50, delivered at above point, could be obtained.

Pittsburgh Freight Rates.

Taking effect at close of business on February 28, all rates to points on New York & New England Railroad and Grafton and Upton railroads from Pittsburgh and points taking Pittsburgh rates were canceled. This also applies to rates on Coke from Connellsville region on above railroads.

Taking effect on Thursday, February 23, Railroad Spikes in carload lots of 24,000 pounds and over will take sixth-class rates from Pittsburgh and points taking Pittsburgh rates to all points of shipment.

Between Pittsburgh and	Group 1. Per ton.	Group 2. Per ton.
Mahoning Valley, Shenango Valley & Wheeling, W. Va.	\$0.60	\$0.75
Steubenville, Ohio.....	.50	.65
McKeesport, Pa.....	.30	.30
Braddock, Pa.....	.30	.35
Duquesne, Pa.....	.60	.75
Kittanning, Pa.....	.50	.55
Johnstown, Pa.....	.75	.80

Rates shown under head of Group 1 will apply on Pig Iron, Mill Cinder and Scale, per gross ton, in carloads of 12 gross tons and over.

Rates shown under head of Group 2 will apply on Billets (Iron or Steel), Blooms (Iron or Steel), Borings (Iron or Steel), Chain Irons (in coils), Crop Ends (Iron or Steel), Ingots (Iron or Steel), Muck or Puddle Bars, Old Car Wheels and Axles, Old Rails, Scrap Iron, Scrap Steel, Scrap Tin, Slabs, unfinished (Iron or Steel), and Wire Rods (in coils), per gross ton, and on Ingot Molds and Cast Iron Pipe per net ton, in carloads of 12 tons, net or gross, and over.

From Pittsburgh, Beaver Falls, Homestead, Rankin, Braddock and McKeesport to	Group 1.	Group 2.
Albany, N. Y.....	\$2.30	\$2.60
Baltimore, Md.....	1.70	2.00
Boston, Mass.....	2.70	3.00
Buffalo, N. Y.....	1.25	1.25
Findlay, Ohio.....	1.75	1.75
New York City, N. Y.....	2.30	2.60
Oswego, N. Y.....	2.00	2.60
Philadelphia, Pa.....	1.90	2.20
Rochester, N. Y.....	1.80	2.00
Syracuse, N. Y.....	2.30	2.60
Utica, N. Y.....	2.30	2.60

Rates shown under head of Group 1 will apply on Pig Iron, Mill Cinder and Scale, per gross ton, in carloads of 12 gross tons and over.

Rates shown under head of Group 2 will apply on Billets (Iron or Steel), Blooms (Iron or Steel), Borings (Iron or Steel), Chain Iron (in coils), Crop Ends (Iron or Steel), Ingots (Iron or Steel), Muck or Puddle Bars, Old Car Wheels and Axles, Old Rails, Scrap Iron, Scrap Steel, Scrap Tin, Slabs, Unfinished (Iron or Steel), and Wire Rods (in coils), per gross ton, and on Ingot Molds per net ton, in carloads of 12 tons, net or gross, and over.

Detroit.

WILLIAM F. JARVIS & Co. of Detroit, Mich., say under date of February 27, 1893: Beyond the continued inquiry for Lake Superior Charcoal, and one or two fairly good sized transactions in Northern Coke Iron, the market here has been featureless during the past week. Lake Superior Charcoal Iron has not yet been advanced in price, but market quotations have in all known cases been firmly maintained. A careful estimate of stocks on hand, added to the amounts which shall be made between now and the opening of navigation, shows there must be very largely reduced stocks on hand to be sold this year, com-

pared with years heretofore. The furnaces which are out will not go in, and unless some substitute be found for Lake Superior Charcoal Iron there certainly will not be enough to go around. The market is unchanged for the few small transactions in Southern Iron, and for one or two of Northern Iron a slight cut was made to secure favorable business, both regarding delivery and tonnage. Finished Material in this market is very inactive at present. Prices of Pig Iron to-day are as follows:

Lake Superior Charcoal, all numbers.....	\$16.50 @ \$17.50
Lake Superior Coke, Bessemer... ..	15.00 @ 15.50
Lake Superior Coke, Foundry, all ore.....	15.50 @ 16.00
Standard Ohio Blackband (40 per cent.).....	15.50 @ 16.00
Southern No. 1.....	14.00 @ 14.50
Southern Gray Forge.....	12.50 @ 13.00
Jackson County (Ohio) Silvery.....	17.25 @ 17.75

New York.

Office of *The Iron Age*, 96-102 Reade street, 1 New York, March 1, 1893.

Pig Iron.—There has been no decided change in the situation of the market. Some brands bring full former prices—that is, the basis of \$15 for No. 1, ex foundry, but concessions of 25¢ @ 50¢ are not infrequent, and, taken as a whole, the market seems slightly irregular, the firmest holders being disturbed more or less by the low quotations made on Iron in which Mill Cinder figures prominently and on the product of furnaces whose owners are not strong enough financially to withstand the pressure incidental to an accumulation of supply on a quiet market. We quote Northern brands at \$14.75 @ \$15.25 for No. 1; \$14 @ \$14.50 for No. 2; \$13 @ \$13.50 for Gray Forge, tidewater. Southern Iron, same delivery, \$14.75 @ \$15 for No. 1; \$13.75 @ \$14 for No. 2 and No. 1 Soft; \$13.25 @ \$13.50 for No. 2 Soft; \$12.75 @ \$13 for Gray Forge.

Spiegeleisen and Ferromanganese.—Ferromanganese continues quiet, with quotations at \$56 @ \$56.50, tidewater, at which figures a few sales have been made. A moderate business has been done in Spiegeleisen, chiefly at about \$25.25 @ \$25.50 for 20 per cent.

Billets and Rods.—Neither domestic nor foreign products have met with freer sale, and the market remains in somewhat unsettled condition, with prices still leaning somewhat in buyers' favor. We quote Steel Billets, tidewater, \$24.50 @ \$24.75; foreign, \$29 @ \$29.50; Wire Rods, \$32.25 @ \$32.75; foreign Wire Rods, \$40 @ \$40.50, and Swedish Rods, \$54.50 @ \$56.

Steel Rails.—In this market few and only small contracts have been placed during the past week. To all accounts 5000 tons will cover the entire business. The price for heavy sections is maintained at \$29, f.o.b. mill, but for light sections relatively lower prices still prevail.

Track Material.—There has been little doing in this line during the past week. Prices are still irregular but without radical change. Spikes are quoted at 1.90¢ @ 1.95¢; Fish Plates at 1.55¢ @ 1.60¢; Track Bolts, square nuts, at 2.40¢ @ 2.45¢, and hexagon nuts, at 2.55¢ @ 2.60¢, delivered.

Manufactured Iron and Steel.—Out side of the Government contract for Ship Plates awarded to the Bethlehem and Carnegie companies there has been no business of striking character. Generally speaking, the demand is fair, but competition continues keen in all departments and prices are without turn for the better. We quote: Beams up to 15 inch, 2.05¢ @ 2.15¢; 20-inch, 2.35¢ @ 2.40¢ for round lots; Angles, 1.85¢ @ 2¢; Sheared Plates, 1.85¢ @ 2.10¢; Tees, 2.10¢ @ 2.30¢; Channels, 2.10¢ @ 2.20¢, on

dock. Car Truck Channels, 2¢ @ 2.10¢. Steel Plates are 1.85¢ @ 2¢ for Tank; 2.10¢ @ 2.25¢ for Shell; 2.40¢ @ 2.50¢ for Flange; 2.5¢ @ 2.75¢ for Marine, and 2.60¢ @ 2.80¢ for Fire Box, on dock. Refined Bars are 1.65¢ @ 1.9¢, on dock and common 1.55¢ @ 1.60¢. Scrap Axles are quotable at 1.90¢ @ 2.10¢, delivered. Steel Axles, 1.85¢ @ 2¢, and Links and Pins, 1.85¢ @ 2.10¢; Steel Hoops, 1.80¢ @ 1.90¢, delivered.

Old Material.—Few and only small sales are reported here, but the business passing is at former prices and the market shows fairly firm undertone. Current quotations are \$17 for Iron Tee Rails, \$14 for Steel Rails, \$16 for No. 1 Scrap Iron, all f.o.b. Jersey City.

The East Lebanon Iron Company announce that they have removed their office to 71 Park Place.

Metal Market.

Copper.—The market is weaker, if anything, than it was at the date of our last review. In any event, offers to sell at prices that appeared to have been exceptionally low a week ago are now common, and the demand drags along wearily, with little indication of immediate improvement. In fact, the purchases by consumers appear disappointing thus far this year, and the comparatively light movement serves, in a measure, to offset the intended effect of the reduction in output. Latterly 12¢ for Lake Superior Ingot and 11¢ for Casting Copper have become common selling prices for deliveries running 60 days ahead. Moderate quantities of Lake product were offered from second hands at as low as 11.90¢ for March and at 11.95¢ for April and May, 11.85¢ for June and 11½¢ for July delivery, by speculative operators. For the present, the appearances are that improvement prior to the opening of navigation is improbable, since consumers are disinclined to buy ahead, except at prices a round fraction below those generally asked. Export demand is extremely slow at the moment.

Pig Tin.—Speculation as to an extra session of Congress and action upon the matter of abolishing the duty prescribed in the McKinley Tariff law has kept a lively interest in the market and served to cause somewhat violent fluctuations in the prices here and in Europe. Up to the present time the indications are that more "short" interest has developed in Europe than on this side of the Atlantic, and it is a remarkable fact that spot stock has, during the past few days, commanded a premium in this market, while the margin between spots and futures has widened in London to about 7/8. Ten-ton lots on the spot have realized 20½¢, and in a few instances about 20.40¢ was paid for 5-ton lots. When the uncertainty of abolition of the proposed duty played the most conspicuous part in gauging operations, as high as 20.65¢ was paid for April delivery, but the recommendation of Commissioner Ayer that the proposed duty be rescinded in the interest of American Tin Plate manufacturers, along with agitation by consumers generally against the law becoming operative, led to free offering, under the weight of which a decline to 20.30¢ took place. It is a remarkable fact, however, that while some operators become so alarmed over tariff probabilities as to be anxious to sell futures freely, the largest holders here and in London not only displayed indifference but held tenaciously to spot stock. Stock ex-steamship now in port realized 20.35¢, net cash, against offers to sell at 20.30¢ for April and May delivery.

Pig Lead.—Under the influence of freer offering for March and April ship-

ment from the primary sources of supply, and apparent indifference about buying on the part of consumers, the market has weakened a trifle. Some few sales were made early in the week at 3.95¢, but that became a common selling price toward the close, and 200 tons or more were parted with at a shade less. At this writing bids of over 3 90¢ for round lots are the exception. Production has been somewhat larger of late, and the prospects are that there will be a further increase as soon as weather conditions permit.

Spelter.—Spot stock of Western Spelter is controlled chiefly by a few dealers, who ask 4.30¢ @ 4.35¢ for carload lots, and offer with apparent indifference. Heavy production has sufficient weight to keep smelters anxious for orders for future shipments however, and little if any difficulty is experienced in securing the same at 4.25¢ @ 4.27½¢, delivered. Sales have been fair, chiefly for April and later shipment, but not liberal enough to have any pronounced bearing upon the market.

Antimony.—Outside of ordinary jobbing distribution there has been little movement, and prices have varied to a moderate extent only. Current quotations are 10¢ for Hallett's, 10½¢ @ 10¾¢ for LX, and 10¾¢ for Cookson's.

Tin Plate.—The demand for future deliveries has fallen off to comparatively small proportions, and business contrasts distinctly with that executed during the week preceding the one under review. Spot transactions have been of commonplace character, moderate, all told, and chiefly at old prices. Supplies here are only fair, and the assortment, particularly of full weight Cokes and Charcoal Terns, is still rather poor. Coke Tins—Penlan grade, IC, 14 x 20, scarce; J. B. grade, do., scarce; Bessemer full weight, scarce; light weights, \$5.10 for 100 lb, \$4.95 @ \$5.00 for 95 lb, \$4.80 @ \$4.85 for 90-lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.60 @ \$5.65; Siemens Steel, IC basis, \$5.75; IX basis, \$6.85. Charcoals—Melyn grade, IC, scarce; Crosses, \$8; Allaway grade, IC, \$5.70; Crosses, \$7; Grange grade, IC, \$5.80; Crosses, \$7.10. Charcoal Terns—Worcester, 14 x 20, \$5.70; do., 20 x 28, \$11.35; M. F., 14 x 20, \$7.50; do., 20 x 28, \$15; Dean grade, 14 x 20, \$5.30 @ \$5.37½; do., 20 x 28, \$10.50 @ \$10.70; D. R. D. grade, 14 x 20, \$5.25; do., 20 x 28, \$10.45; Dyffryn, 14 x 20, \$5.50; do., 20 x 28, scarce. Wasters—S. T. P. grade, 14 x 20, \$5; do., 20 x 28 \$9.75; Abercane grade, 14 x 20, \$4.95; do., 20 x 28, \$9.62½.

Coal Market.

In the Anthracite Coal trade the general situation is confused and uncertain, owing to the Reading troubles, but prices are not affected. The combine schedule still holds good and is closely followed by the independent outsiders, so that one of the largest of the latter remarks that no sales below are heard of. At the same time time Coal is in good supply, and the recent scarcity of small steam sizes is hardly felt any longer. Lehigh Pea is \$2.40 and Free Burning, \$2.65, f.o.b.; Buckwheat, \$1.85 to \$2.35, according to quality.

The quantity of Coal moving out for consumption is large. The effects of the Reading rupture are seen in the feeling of uncertainty respecting the future, there being little disposition to buy except from necessity. There is a general understanding that spring prices will drop April 1 to a minimum, the plan being to work up gradually by a succession of advances through the season. The basis, however, both for Anthracite and Bituminous is higher than it was a year ago, say \$1

average for the former and 25¢ for the latter. Railroad tolls for Bituminous will be advanced 25¢ @ 50¢ per ton April 1, the Baltimore & Ohio and Pennsylvania having already given notice to this effect. The final outcome of the Reading situation nobody pretends to know. It is assumed that the Lehigh Valley will stick to the combine whatever happens in New England. The Jersey Central is out to stay. Competition by the railroads to obtain Coal transportation is therefore not improbable. At Tuesday's meeting of agents nothing was done.

The Brown Hoisting & Conveying Company attached the Reading Coal deposits in Buffalo and Milwaukee to secure a claim for \$20,000.

The total shipment of Anthracite Coal for the week ending February 18, as reported by the several carrying companies, was 840,606 tons, an increase of 57,828 tons, and for the year to that date the total tonnage has been 5,267,030 tons, an increase of 129,595 tons over last year.

The United States Consul at Martinique expects that Americans will eventually control that market. English Coal costs there about \$5.38.

To get 10¢ a day added to the wages of eight boys 2800 miners at Nanticoke have gone on strike, sacrificing \$5500 a day in wages. One day's wages of all the miners would pay the advance for a quarter of a century.

Financial.

The failure of two or three large iron concerns in Pennsylvania, the insolvency of a great railroad corporation and rumored receiverships in prospect for several others are events which have divided attention with the Treasury situation and the silver problem. Happily the gold drain is checked for the moment, leaving an alleged respectable balance of \$3,000,000 or upward of free gold for the new administration, to be inaugurated on Saturday. The proposed bond issue is still in abeyance, though the advocates of this measure suggest, as a reason for prompt action, that any encroachment on the \$100,000,000 reserve might make it no longer possible to sell 3% bonds at par for gold. With the Government credit impaired, bonds expressly payable in gold might not find a ready market, the metal being held for a premium. An admonition is also found in the fact that although wheat and other commodities are so much depressed, imports are disproportioned to the volume of exports. It is an assuring circumstance that heavy losses among speculative operators have no perceptible effect on legitimate trade. Domestic trade is satisfactory for the season. The east-bound traffic from Chicago is so heavy that the railroads are unable to handle it.

The Wall street markets have been unusually agitated, with Reading in the hands of a receiver and other roads lately in the McLeod combination seriously affected. The resignation of Charles Parsons, president of the New England, was variously understood. The decline of Reading stock from 65 to 28 within a single twelve month indicates enormous losses. On Thursday sugar broke heavily on liquidation, and Reading and the other coal shares were generally lower. There was also a sharp break in Northern Pacific preferred. On Friday, after an unsettling drop in the Reading specials, the market irregularly recovered, but selling of New England was liberal at intervals, because of unloading by the Philadelphia clique. On Saturday there was a fall in Sugar, Reading, New England, the grangers, Northern Pacific preferred and Cordage, followed by a partial recovery. Then Northern Pacific preferred fell off, and on the appearance of the bank statement the whole list de-

clined. On Monday Reading nearly touched the lowest point, and Erie was weak, with a receivership talked about as being among possibilities, and a story was current that a receiver would be appointed for the Lehigh Valley Railroad.

United States bonds were firm at the following quotations:

U. S. 4½s, 1891, extended.....	99¼
U. S. 4s, 1907, registered.....	113
U. S. 4s, 1907, coupon.....	112½
U. S. currency 6s.....	107½

The weekly bank statement showed a decrease of \$4,221,125 in the legal reserve. Loans contracted, \$3,947,700. Specie decreased, \$2,741,300; and legal tenders decreased, \$4,206,100. Deposits decreased, \$10,905,100.

The loan market was closer, reflecting calling of loans by the banks in consequence of large demands by country institutions. Call loans on stock collateral averaged about 6%. Time loans were in more active request at about 6%. Commercial paper was slow, with large offerings. Western banks report that applications for renewals are frequent, collections being tardy on account of bad roads. Dry goods jobbers in New York say their bills are promptly paid at maturity, and the trade is in good shape. The outlook is as favorable as at any time, if not better, in consequence of a more settled prospect as to legislation in regard to anti-option and silver.

In the merchandise market there are no radical changes. Fluctuations in grain are narrow. Breadstuffs were weak and lower, with dull foreign markets, light export demand and good receipts West.

The possibility of a light money market inspired caution. While the visible supply of wheat has decreased, the total is at least 111,000,000 bushels, and the holders show signs of fatigue. The foreign markets are supplied in good measure from other sources. Hog products have undergone some reaction and prices are easier. Orders for all sorts of merchandise are curtailed by difficulties in transportation. Rubber is less active. A break in the cotton mills strike in England excites hopes of a better demand for the staple.

Cleveland.

CLEVELAND, OHIO, February 28, 1893.

The statement, miscellaneous published, that no Iron Ore has been sold up to date is not strictly true. Some special Ores have been sold at figures very close to \$4 ¢ ton. These sales are of no particular significance and probably do not involve over 50,000 or 75,000 tons of Ore, but they are all the same interesting as showing the trend of the market. These sales have been made during the past ten days and are, necessarily, made independent of the general situation, which seems to be unchanged. There were reports last week of sales of Norrie Ore to the Illinois Steel Company at \$3 75 ¢ ton. The report seems to have been wholly unfounded. Local dealers deny most emphatically that any sales have been made of old standard Ores. The general impression is, however, that when prices have been straightened out Bessemer Ore will bring a price very close to \$4 ¢ ton, and that lake freights will be arranged on about this basis: Ashland and Two Harbors, \$1.10 or \$1.15 ¢ ton; Marquette, 95¢ or \$1 ¢ ton; Escanaba, 80¢ or 85¢ per ton. The lake carriers claim to be particularly independent this year and are asking odds of no one. The amount of coal for upward transportation and of grain to come down the lakes seems likely to keep the vesselmen fairly well occupied. Mines like the Chandler, Minnesota, Ashland, Lake Superior, Norrie and Colby are planning for an extraordinary output this year. If the owners of these properties succeed in this it is certain that good Bessemer Ore will

bring close to \$4 ¢ ton, with the poorer grades selling for \$3.75 @ \$3.85. The output of the Mesaba range will hardly be up to the mark. James Corrigan, one of the best-known local dealers, has been visiting in the vicinity of these new mines for several weeks and has just returned. He says that the output cannot possibly exceed 500,000 tons, and is likely to be below that sum. A local paper says, editorially:

The greatest reduction on former estimates is due to the fact that at the Biwabik, where the Kimberly interests centered their operations, and the Mesaba Mountain, the principal Oliver mine, there is convincing evidence that if any Ore at all is shipped in 1893 it will be very late in the season. A considerable product from these mines figured in all previous estimates, and failure is not attributed to the extent of the Ore deposits, but to the disadvantages encountered in trying to strip the surface with steam shovels. At the Biwabik, where it was expected that all stripping would be done during the winter, the work so far accomplished in the removal of a small portion of the covering has amounted to practically nothing, and time cannot be gained in resorting to the sinking of shafts, as such operations must go on slowly under any circumstances. In preparing for the stripping work during the winter, the managers of these new mines had expected that snow would come ahead of severe frost and protect the ground, but the contrary was the case, and upon putting the steam shovels to work the surface was found to be frozen to a depth of 10 inches or more. The Mountain Iron, owned by the Merritts, and the Cincinnati will make fair shipments, but at the Ohio, which is considered a big mine, nothing is being done to indicate any movement of Ore to market this year. The Commodore, formerly the New England, will ship some Ore, but not a large amount, and from the Franklin, formerly the Wymer, there are only hopes of shipments. Hale will also market a little Ore, but it is non-Bessemer.

Iron Ore.—During the week just closed nearly 30,000 tons of Ore were sent forward to the furnaces. Some of the old Ore on the docks has been sold, but at somewhat shady prices. The market for new Ore seems as far away from development as ever, although, as stated above, some new Ore is being sold. It is, however, for a report of a generous sale from one of the standard mines that everybody is waiting. This may come to-morrow and may not come for many weeks. The general feeling is in favor of a \$4 mark for good Bessemer, regardless of vessel rates, and of buyers' offering about \$3 ¢ ton for the average non-Bessemer.

Pig Iron.—We hear of a sale of Bessemer Iron at \$13.65, Cleveland, and of Gray Forge at \$12.40, same conditions. The market is really rather weak, and little is being done in the way of sales. The general tone of the market is, however, very fair, and it is generally agreed that the trend is in the right direction. Foundry Irons are a bit weak, but may revive at any time.

Scrap.—The market is still weak, with few indications of immediate improvement. No. 1 Railroad Wrought is quoted at \$15 25 @ \$15 50; Wrought Turnings at \$7.75 @ \$8; Cast Borings at \$6, and Old Axles at \$19 @ \$19.50.

Old Rails.—The demand is bracing up, and sales of Old Americans at \$20.25 @ \$20.50 are reported.

Manufactured Iron.—There is a steady demand for Common Bars at 1.60¢ @ 1.65¢, in stock.

Freights.—Ore: Cleveland to Valley Points, 62½¢; Cleveland to Pittsburgh, \$1.05. Pig Iron: Valley Points to Cleve-

land, 60¢ $\frac{1}{2}$ ton; to Pittsburgh, 60¢, Muck Bar, Blooms, Billets, Scrap, Iron and Steel Rails, Old Wheels, &c.: Valley Points to Cleveland, 70¢ $\frac{1}{2}$ ton; to Pittsburgh, 75¢ $\frac{1}{2}$ ton; to Boston, \$3.50 $\frac{1}{2}$ ton; to New York, \$3.10 $\frac{1}{2}$ ton; to Philadelphia, \$2.70 $\frac{1}{2}$ ton.

Boston.

Office of *The Iron Age*, 146 Franklin St.,
BOSTON, February 28, 1893.

Pig Iron.—In spite of the storm and the terrible condition of the roads and streets, there is a rather better trade in Pig Iron, but it is largely in the way of orders for Iron to arrive. The foundry people are busy, with some of them very busy, and they require a full volume of iron. They have lately been allowing prominent dealers to place orders for them. At the same time the receiving of Iron is hindered by the bad condition of both rail and water transportation. The market is steady on Southern Iron at: No. 1, \$15.50 @ \$16; No. 2, \$14.50 @ \$15; No. 3, \$14 @ \$14.50. These prices are for Iron delivered in Boston. There is also a little better request for Pennsylvania Iron, with quotations at: No. 1, \$15 @ \$15.50; No. 2, \$14 @ \$14.50; Gray Forge, \$13.50. These prices are for Iron at shipping port; small lots on the spot costing more. The demand has been better for spot lots of late, owing to the difficulties of transportation. Other Western Irons are steady at \$17.75 @ \$19, for Iron delivered in Boston, as to quality.

Bar Iron.—The position of Bar Iron is rather more in the buyer's favor. It seems that the sales of Iron here by a Portland, Maine, rolling mill, at low prices, have been rather more than followed down by one or two Massachusetts mills, and now the trade is getting Iron lower. They are also giving Iron out of store to their customers at easier prices: Ordinary Bars from mill, 1.60¢ @ 1.65¢; from store, 1.65¢ @ 1.70¢. The best known Bars from Puddled Iron are quoted at 1.85¢ @ 1.95¢ from mill; from store, 2.10¢ @ 2.25¢. Norway and Swedish Bars are quiet and unchanged at \$66 @ \$67.50 $\frac{1}{2}$ ton for Bars and Shapes on the market here.

Steel and Steel Plates.—Dealers here complain of very low bids on contracts that they are obliged to encounter, though they find the market at the Iron and Steel centers firm, by reason of the position of the raw material. The quotations on Steel for this market are not admitted to be any lower: Bessemer Steel, 2.15¢ @ 2.25¢; Machinery, 2.10¢ @ 2.25¢; Tire and Sleigh Shoe, 2¢ @ 2.10¢; American Cast, 7¢ @ 7½¢; English Cast, 13¢ @ 15¢; American Steel Rails, \$29 at mill. No new contracts for Steel Rails are mentioned. It is said that the Boston & Maine is rather sore over the Reading difficulties, and has refused to buy Rails, but it is more safe to conclude that all of the roads in New England have had all they could do to take care of snow, to say nothing of buying Rails. Agents and dealers in Steel Plates continue to note a dull market, with quotations about at: Tank, 1.95¢ @ 2¢; Shell, 2.05¢ @ 2.10¢; Flange, 2.80¢ @ 2.35¢; Fire Box, 2.65¢ @ 3.50¢.

Structural Iron.—The trade in Building Iron is being very badly hindered by the storm and delays to transportation. Iron and Steel is overdue from Pittsburgh 18 and 20 days and is not here yet. Agents are taking every possible turn to keep their customers along. But it happens that builders are also a good deal hindered by the storm and the condition of the streets. One prominent Boston builder, with four contracts for big buildings on his hands, finds his foundations

buried in snow and ice, and it is costing him thousands of dollars to keep his men at work at all. He is not in much of a hurry for his Iron. The market is still quoted at: Beams and Channels, 2.10¢ @ 2.20¢ from mill; 2½¢ @ 3¢ from store; Angles, 2¢ @ 2.12½¢ from mill; 2½¢ @ 2½¢ from store; Tees, 2.40¢ @ 2½¢ from mill; 2½¢ @ 3½¢ from store. The Boston Bridge Works have lately placed contracts for some 600 tons of Iron and Steel with different concerns, to go into several jobs that the company have in hand. The company are also shipping materials to Cuba for a large railway bridge there. They have besides a sugar works contract there that will require a good deal of Iron, and this Iron it is about to commence the shipment of. The Brooklyn City Railroad will probably begin to receive the Iron for its big power house, already mentioned in *The Iron Age*, next week.

Pipes and Tubes.—The weather and the conditions of transportation have hindered the Pipe trade, and business is dull. Prices are also more in the buyer's favor, though quotations are retained. But it is perfectly well understood that concessions are made on large lots.

Scrap.—Old Iron is dull and featureless at the quotations noted last week.

British Iron and Metal Markets.

[Special Cable Dispatch to *The Iron Age*.]

LONDON, WEDNESDAY, March 1, 1893.

The short interest in Scotch Pig Iron warrants has been eliminated and the market has relaxed into normal condition, with outside speculative interest very tame. Price receded to as low as 41/ for prompts, at which quite large transactions took place, but, owing to lack of interest, there was a further decline to 40/4 for prompts, and forwards now command a premium. A large quantity of Iron has been put into store to meet contracts for warrants. Official returns show a total of 352,000 tons, against 345,000 tons a week ago. Makers' prices for nearly all brands have been reduced, some to the extent of 2/. There are at present 65 furnaces in blast. Cleveland warrants have receded to 34/2½, and Hematites have remained almost stationary at 45/7½, with dealings very moderate. Stock of Cleveland Iron in public stores has increased to 45,000 tons.

Pig Tin prices have been irregular, advancing early in the week under the influence of light offerings, increase of outside speculative interest and larger American purchases. The report of appeal to remove the proposed duty in the United States had adverse effect, however, and the market is at present somewhat feverish, with fairly active interest in futures.

Copper is somewhat stronger and business has been more active, including good purchases by consumers, as well as livelier speculative interest. More favorable statistical exhibit has served to enliven operations somewhat.

In the Tin-Platemarket there have been no new developments. Fair purchases were made of oil sizes, chiefly for Russia, but otherwise business has continued rather slow. Stocks at Swansea returned as being 172,000 boxes against 227,000 boxes, at the corresponding period last year.

Scotch Pig Iron.—Market very quiet and prices easier under the influence of accumulation of supplies.

No. 1 Coltness, f.o.b. Glasgow.....	54/
No. 1 Summerlee, " ".....	51/
No. 1 Gartsherrie, " ".....	49/
No. 1 Langloan, " ".....	53/
No. 1 Carnbroe, " ".....	42/6
No. 1 Shotts, " at Leith.....	52/
No. 1 Glengarnock, " Ardrossan.....	49/8
No. 1 Dalmellington, " ".....	47/
No. 1 Eglinton, " ".....	44/

Steamer freights, Glasgow to New York, 1/; Liverpool to New York, 7/6.

Cleveland Pig.—The market is dull and prices are weak, with sellers at 34/3, f.o.b. shipping port, for No. 3 Middlesborough.

Bessemer Pig.—Very quiet market and prices rather weak, with sellers at 46/6 for West Coast brands, Nos. 1, 2 and 3, f.o.b. shipping port.

Ferromanganese.—Demand continues slow and prices still lean more or less in buyers' favor. English 80 % quoted at £10. 15/, f.o.b. shipping port.

Steel Rails.—Demand is slow, but makers hold for former prices. Heavy sections quoted at £4, f.o.b. shipping port.

Steel Slabs.—Dull market and prices without change. Bessemer quoted at £4, f.o.b. at shipping point.

Steel Billets.—A fair business in special kinds, but the general market slow and easy. Bessemer, 2½ x 2½ inches, quoted at £4, f.o.b. shipping point.

Steel Blooms.—Business light and chiefly at old prices. Makers quote £4 for 7 x 7, f.o.b. shipping point.

Old Iron Rails.—The market very quiet and without change. Tees quoted at £2. 7/6 @ £2. 10/ and Double Heads at £2. 10/ @ £2. 12/6, f.o.b.

Scrap Iron.—Moderate demand only, and dealings chiefly in small lots at old prices. Heavy Wrought Iron quoted at £2, f.o.b.

Crop Ends.—Sales are very light and the market continues rather weak. Bessemer quoted at £2. 7/6 @ £2. 10/, f.o.b.

Manufactured Iron.—Demand still runs light and prices favor buyers, but show no quotable change. We quote, f.o.b. Liverpool:

Staff. Ordinary Marked Bars	8 0 0 @	£ s. d.
" Common	6 5 0 @	£ s. d.
Staff. Blk Sheet, singles.....	7 7 6 @	£ s. d.
Welsh Bars (f.o.b. Wales)....	5 7 6 @	£ s. d.

Tin Plate.—Under the influence of fairly active inquiry, the market is firm in tone, though quiet. We quote, f.o.b. Liverpool:

IC Charcoal, Alloway grade.....	13/6 @ 14/0
IC Bessemer Steel, Coke finish.....	12/0 @ 12/3
IC Siemens " ".....	12/3 @ 12/6
IC Coke, B. V. grade 14 x 20.....	12/0 @
Charcoal Terne, Dean grade.....	13/6 @ 14/

Pig Tin.—Market closes irregular and unsettled. Straits quoted at £91. 15/ for spot and £92. 10/ for three months' futures.

Copper.—Fairly good demand at the close and the market firm. Merchant Bars quoted at £45. 15/ @ £45. 17/6, spot, and £46. 5/ three months' futures. Best selected, £50.

Lead.—Dealings have been moderate, but prices are firmer, with £9. 12/6 quoted for Soft Spanish.

Spelter.—Demand has improved somewhat, and the market is firmer at £17. 7/6 for ordinary Silesian.

THE WEEK.

The improved mail service, to be expected by the American liners when the bags are landed at Southampton is remarked upon by a London correspondent, who says: "Over and over again passengers have got to the metropolis from the German boats at Southampton long before the mails dispatched the same day via Queenstown arrived. If the postal authorities could arrange different sailing days for the American Lloyd boats from New York there would be an almost ideal service for London."

The geological survey furnishes the information that there exists in Texas a chalk bed nearly as large as the whole of England; a stratum, parts of which are 500 feet thick, stretching from the Red River to the Rio Grande and more valuable than all the gold mines in the country. Also, near Austin, in Texas, have been discovered enormous beds of true flints, used in the manufacture of pottery and glass.

The American Line pier, foot of Vesey street, will be known as the Washington pier. The shed will be of iron, two stories in height, the first devoted entirely to trucks and baggage and the second to the use of passengers, who will reach it by means of a bridge over West street. The shed will be 600 feet long.

The loss by the burning of the Southern Pacific's car shops in San Antonio, Texas, is estimated at \$100,000.

Germany's grain supply last year was chiefly derived from the United States. The importations from this country amounted to 46,500,000 bushels.

New Orleans merchants are making a renewed effort to center the lumber trade of the South at that port. Exports of lumber from New Orleans increased 27 per cent. last year.

Experience on the Wabash Railroad serves to show that those rails that have been long in use, if taken up and relaid in a reverse position, so that the points of compass are changed from north to south, or *vice versa*, the fiber is speedily broken up, as supposed from the effects of polarization.

The first concern of the new Secretary of Agriculture, J. Sterling Morton, will be to urge a national forestry law.

The Trades League of Philadelphia urges commercial bodies to co-operate for the more expeditious delivery of the mails in all our large cities.

The Canadian Government having ceased to discriminate against American merchandise passing through Dominion canals, President Harrison issued a proclamation revoking the tolls levied on Canadian vessels and cargoes in the Sault Ste. Marie Canal.

Colorado banks are accumulating large gold reserves, expecting to profit should gold go a premium.

It is alleged that a reduction of wages is contemplated in the seven mills of the Western wire trust.

The proposed removal of extensive car works from Detroit to escape excessive taxation is followed by a call for a meeting of the commercial bodies in that city to discuss "the antagonism shown against manufacturing and other corporations." The car works disburse \$2,000,000 annually among the local traders.

Mexico offers a bounty for the encouragement of immigration.

The great naval dry dock being constructed at Port Royal, S. C., is 500 feet in length and about 120 feet in width—

the largest on the Atlantic coast and 20 feet wider than any other in the United States. There will be used in its construction over 6000 piles and 2,000,000 feet of lumber. Its pumps will discharge over 75,000 gallons of water a minute and will fill the basin in one hour.

Dr. Rainey has purchased land at the foot of Sixty-fourth street for his bridge at Blackwell's Island.

Florida promises to rival South Carolina in the production of rice.

American plows, harvesters and other agricultural implements are frequently advertised in foreign papers.

American silver coin in British Columbia is at 20 per cent. discount. The objection there, as in Canada, is that it displaces the local currency issues.

The argument is advanced, not without some show of reason, that the increased amount of cotton, wheat and other commodities now being carried by speculators, as compared with one year ago, is the direct result of an abundance of money, loans being obtained for this purpose much more easily than in some former years. The excess of cotton now carried in stock is 534,000 bales, compared with last year at this date, and of wheat 40,000,000 bushels. The former item alone represents \$24,000,000. Instead of borrowing, speculators would find it more advantageous to sell if money was not so easy.

A contract has been signed with the Phoenix Bridge Company for the erection of the new terminal station of the East River Bridge in Brooklyn. It calls for the completion of the structure in eight months. The cost is to be \$221,157.05.

Cotton culture in Asia is increasing so much that a Liverpool journal says: "It is quite admissible to reckon that in a future, which is perhaps not very distant, the whole quantity of 150,000 tons of cotton now consumed by Russia, and for which she is still tributary to America and Egypt, might be furnished by Central Asia, the Trans Caspian territory and Trans-Caucasia—that is to say, that Russia will be able to supply its own requirements." Both as to oil and cotton Russia may become independent of American supplies.

Beet sugar production in Europe has entirely cut off the demand for Cuban sugar in that direction.

European merchants in Mexico complain that rates on merchandise passing between Vera Cruz and the capital are exorbitant. The railroad companies, on the other hand, claim that any decrease would be discrimination against manufacturers in the United States.

Several tank steamers have been chartered to transport molasses in bulk from Cuba to the United States during the season ending next September.

Smokeless Coal.

A method for the eliminating of smoke from the combustion of coal has been invented in Germany, says the *Railway Review*, and its tests have proved so satisfactory that contracts have been made with some of the largest concerns in the country, including several of the principal lines of steamers.

By the new method the coal is first reduced to powder by machinery. This inflammable dust is projected into the furnace by a current of air, automatically regulated, and as soon as it is inside it gives forth an intense blaze. Oxygen be-

ing introduced by a new contrivance, the dust does not fall to the bottom, but floats in space and is consumed to the last particle. There is no perceptible smoke and no ashes. The fire can be started or stopped in a moment, and pressure can be maintained at any desired scale, while the wear and tear of furnaces and boilers is said to be greatly reduced.

Antiquity of the Saw.

The saw is an instrument of high antiquity, says one of our foreign contemporaries, its invention being attributed either to Dædalus or to his nephew Perdix, also called Talos, who, having found the jaw of a serpent and divided a piece of wood with it, was led to imitate the teeth in iron. In a bas-relief, published by Winckelmann, Dædalus is represented holding a saw, approaching very closely in form to the Egyptian saw. St. Jerome seems clearly to allude to the circular saw, which was probably used, as at present, in cutting veneers. There are also imitations of the use of the center bit, and even in the time of Cicero it was employed by thieves. Pliny mentions the use of the saw in ancient Belgium for cutting white building stone; some of the oolitic and cretaceous rocks are still treated in the same manner both in that part of the continent and in the South of England. In this case Pliny must be understood to speak of a proper or toothed saw. The saw without teeth was then used, just as it is now by the workers in marble, and the place of teeth was supplied, according to the hardness of the stone, either by emery or by various kinds of sand of inferior hardness. In this manner the ancient artificers were able to cut slabs of the hardest rocks, which consequently were adapted to receive the highest polish, such as granite, porphyry, lapis-lazuli and amethyst.

Soft vs. Hard Steel for Building Construction.

According to the report of a committee appointed by the *Bezirksvereines Deutscher Ingenieure*, soft steel is to be preferred to hard for building purposes. For ordinary purposes the tensile strength should be between 23.45 and 28.60 tons per square inch, with a minimum elongation of 20 per cent. in test bars 8 inches long. For bridge work the tensile strength should be between 23.45 and 27.30 tons. It was not considered advisable to specify any chemical analysis, as the physical properties afford a sufficient index to the quality of the metal, this quality being dependent not only upon the composition of the metal, but also upon the mechanical combination of the different constituents. In considering if it be necessary to specify not only the class of material, but also the manner of its manufacture, the committee decided that the specification should be limited to such normal conditions as could be certainly complied with, and that any minute limitations were technically impracticable and commercially injurious. The committee states, however, that except when unavoidable the material should not be worked at a blue heat. In regard to the increase of working load the committee states that it can profitably be increased to 6.35 tons for live loads and 7.62 tons for dead loads. As to the meaning of the term "Flusseisen" (ingot iron) it may be said that, strictly speaking, it is limited to the product of the basic open-hearth furnace and the Thomas or Basic Bessemer converter. Acid open-hearth metal cannot always be included.

It is stated that in England those parts of locomotives which are liable to rust are made of galvanized iron, and that this includes the inside of tender tanks and also the coal spaces.

HARDWARE.

Condition of Trade.

THE BUSINESS of the past month is generally regarded as very satisfactory and as having been larger than last year. There was a heavy trade in some of the staple lines, which still continues, keeping manufacturers busy and suggesting that perhaps there may be a shortage before long. At the same time, the business in general Hardware has been at least up to the average, so that there is little reason for complaint, in view of the trade with which the year has opened. With the advance of the season there is now an increase in orders, and both jobbers and manufacturers are kept fully occupied. In prices there is some improvement on certain lines of goods that lie near the raw material, but, as a rule, the Hardware market is not characterized by special strength. There is a disposition on the part of the trade to buy only in such quantities as their business is sure to demand in the near future, their policy being to purchase frequently and in moderate lots rather than to place liberal orders. There is an evident sluggishness in collections in many parts of the country, which is accounted for in part by the general financial condition and also by the disposition of the farmers to hold their products, while, at the same time, the condition of the roads and the character of the weather have interfered to some extent with the usual course of business.

Chicago.

(By Telegraph.)

Hardware jobbers report a better condition of trade, which has been improved to a considerable extent by the firmer feeling in staple goods. The tone of reports now coming in from traveling salesmen has changed decidedly. Up to the past week they complained of brisk competition on Wire Nails and other staples and expressed very bearish views on the situation. Advice received from headquarters, however, withdrawing former quotations and insisting on the cancellation of offers previously made, immediately brought about a very decided change. Merchants came to the conclusion that the bottom had been reached and orders from that time have been coming in briskly. The Shelf Hardware jobbers and Heavy Hardware jobbers both report their sales larger than up to the corresponding time last year. A still heavier rush is expected as soon as spring opens, which must be during the course of the present month unless all reasonable signs fail. The ques-

tion will then be how to get goods rather than what they will cost. Collections are not as favorable as they have been. This is imputed partly to the policy of the farmers in continuing to hold on to their stocks of grain, and partly to the efforts of Eastern banks to create an artificial scarcity of money. The situation is not regarded with apprehension, but is expected to clear itself up naturally as the season advances and grain stocks are released from farmers' hands.

St. Louis.

(By Telegraph.)

The demand for Hardware continues to show enlarged volume and the month just closing will show a largely increased trade over the corresponding month of last year, some jobbers reporting as much as 40 per cent. increase. The new Cut Nail list mentioned in our last report is not yet thoroughly understood by the retail Hardwaremen, but among the jobbers is favorably commented upon. Indications point to a heavy spring trade in all lines, but prices continue heavy and unsettled. The demand for Barb Wire and Wire Nails is improving, but prices are unchanged. Cut Nails are in good demand.

Baltimore.

CARLIN & FULTON.—It is perhaps a matter for congratulation that the month of February just ended had but 28 days instead of leap year's 29, for what trade has been done has been in spite of all the disadvantages attending snow and ice, rain and thaw until the memory of the oldest inhabitant fails to recall a winter of equal severity.

And yet while the month has possibly not aggregated in sales the amount done in January, it will compare most favorably with February of 1892, and we have no doubt that the trade which has been hindered and prevented by the elements will help to swell the volume of business in the month of March, provided the roads get in such condition that travel can be made possible.

The reduced railroad fares to those desiring to attend the inauguration ceremonies may induce some trade to visit the Northern and Eastern markets earlier than usual, but our experience has been that business is too serious to be forced or stimulated by the excitements of an excursion or the temptation of a reduced fare. These opportunities are mostly availed of by those on pleasure bent, and are beneficial to the railroad companies, the hotels and boarding houses, and perhaps in a measure to the retail trade, but are of little advantage to the wholesale dealers.

The weather was not the only uncertain feature of the month just passed, for the Nail manufacturers were just about as variable, but it is hoped now that they have settled finally upon a schedule of extras and the base size, which will last at least until the weather

changes again, though we hope much longer.

It is hard to speculate upon the future of trade, but in the effort to get better prices for many of the staples, such as Cut Nails, Wire Nails, Barb Wire, and with other changes in items of less importance, we can see a reaction, the result either of dire necessity or of ability on the part of the manufacturers to better control the market.

What effect the new administration will have upon the trade of the country through its financial policy remains to be seen and the business interests of this entire land are waiting with breathless anxiety the inauguration, not merely of a new President, but of a definite policy which will at once restore confidence in the integrity of our currency and maintain the credit of this nation in the markets of the world.

Cleveland.

THE W. BINGHAM COMPANY.—The freight blockade spoken of in our last has been raised and things are moving along again in their even channels; consequently, trade has correspondingly improved, so that the months of January and February, taken together, will be fully up to the average. Agricultural Tools are in especially good demand and the business in this line promises to exceed by considerable that of last year. Builders' Hardware also, in this locality, has a promising outlook, as there is an immense amount of building in contemplation and much already on the way. The market on staple articles is about in the condition noted in our last. Wire Nails are higher and makers are talking of a still further advance, and Wire has a firmer tone, while rumors of combinations and consolidations of all kinds are flying through the air. Collections with the Hardware men are not good, although other lines report them as fair and some good. Why this difference should exist we cannot explain.

Louisville.

W. B. BELKNAP & Co.—Just at present we are struggling with floods in the rivers and an excessive rainfall over much of the territory tributary to this market. The streams that a short time since were not navigable by reason of ice are now not altogether available by reason of the overflowed banks. However, we are gradually getting in shape for a fine spring and probably abundant harvest.

Trade is all that could be desired in volume, and there are evidences of a little more determination on the part of manufacturers to get better margins for their product.

There is an immense demand for Plain Wire, Barbed Wire and Wire products generally. Prices have been put up quite sharply within the past few days.

The new Nail Card adopted by the Cut Nail men, after a long effort to get up something which should be irrespective

of average, in that particular is a failure. After receiving a number of them, accompanied by a flourish of announcements, orders sent in to Wheeling at quoted prices have been declined, accompanied by a very inconsistent circular.

The last line of the resolution reads that no quotations will be made on any basis of average, yet the sentence immediately following declares that the prices will be made at a straight base price "for ordinary assortments." This leaves it with the mills to say what an "ordinary assortment" is. In other words, puts them back exactly where they were before, as any one is liable to send in an extraordinary assortment.

We do not see, for our part, that they are any better off than before the agitation began.

New Orleans.

A. BALDWIN & CO.—Business in this section shows a very slight decrease, both as to the number of buyers in the city and also in the mail department. We, however, congratulate ourselves that it is still a decided improvement on last season, and the prospects for the coming thirty days are certainly encouraging. The uncertainty as to the adoption of the new Nail card has somewhat unsettled the prices in this staple; most of the jobbers still selling on the old basis.

A more confident tone is being felt by merchants generally as to the prospects for the present year, and there is not the same hesitancy in placing orders that existed in the latter part of last year.

Philadelphia.

SUPPLER HARDWARE COMPANY.—The difficulties that have surrounded trade efforts during the last ten days have temporarily had a depressing effect upon the distribution of merchandise.

Locally our entire section has been more effectually snow bound than at any time during this winter.

Traffic has been interfered with; interior towns have been disconnected; public highways in the rural districts blocked with snow, and, as a consequence, stages or other means of conveyance, necessarily withdrawn by orders of the Snow King, whose sentinels stood from 4 to 8 feet high.

Trains have been delayed, and, in many instances, passengers uncomfortably detained. Freight remained untouched at various railroad stations, and freight cars blocked along the lines of the railroads.

Salesmen, finding sections of their routes inaccessible in some instances, have been obliged to retrace their steps to the fountain head and await further orders.

In sections south of us, the continued cold weather and ice formation has interfered with transportation and retarded trade somewhat.

As a whole, one would wonder at the amount of goods that are being packed in the various warehouses ready for shipment on a day's notice.

The fact is, the country districts have no overstock of goods; consequently, buyers have but little patience with any unavoidable delay in making shipments, and, indeed, some cases indicate, through

voluminous correspondence, that they even hold the shipper morally responsible for delays in freight after leaving the railroad stations.

It would seem unnecessary to state, after the above, that collections are not up to the standard volume.

The microscopic eyes of the entire financial world have recently been centered toward our city, as the head of the Reading Railroad system, and the unprecedented changes in the holdings of over two million shares of that stock caused a financial hurricane, not only in our city, but extended to New York, and from there broad-cast over financial centers as far off as London.

Depleted values were no doubt the intention of the originators of the raid, in which they succeeded most successfully.

The gathering cloud, which preceded the storm, was seen by some shrewd bank officials and officers of financial institutions, who began husbanding their resources some days in advance, and discounts only to a limited extent were temporarily given to the most desirable customers, and to-day empty pocket-books or empty vaults do not alone register the results.

It is quite possible that had not the system of Clearing House Exchanges been adopted about one year ago the financial result would have been far more stupendous, as the volume of transfers, which put many millions of dollars in jeopardy, have never before been equaled, and, if report be true, much of the stock held by those who have for years stood faithful to the road succumbed to the necessities to which stocks, issued as collateral, are liable.

Philadelphia is especially interested in this railroad as a competing line. President McLeod of this road had inherited difficulties with which he was compelled to contend. Add to this, jealousies to subdue, financial embarrassments to overcome, poor rolling stock to replace, and circumscribed limits in area confronted him.

One by one the barriers showed the effect of a master hand. The achievements, so comprehensive and far-reaching, naturally antagonized other interests, and consequently could not fail to arouse the slumbering antagonists, who first quietly reached out their paws in an attempt to quiet the uneasy and ambitious rival; but no! there was no halt. Determined and restless ambition captured new fields and acquired new roads; then the antagonized lions paced uneasily in their dens, and at one unguarded moment found the secret of where hypothecated bonds were placed, and the result is known and felt over the entire civilized world.

The road in the hands of a receiver was the only recourse to prevent themselves going to the hands of rival corporations, but the roadbed and the rolling stock are intact, and the railroad corporation is essential to move the daily increasing merchandise shipments.

The failure to understand the financial problem, which our Government has recently been called upon to solve, is quite excusable in those persons who make no pretensions of giving the subject more than a passing thought, or whose opin-

ions are entirely molded by written articles on financial strategy; but one would naturally suppose that those who, by virtue of chance or by selection, are vested with authority to write editorially on the subject, would familiarize themselves more fully with the facts of the situation before expounding their opinions so freely.

The continued large shipments of gold to Europe has naturally caused uneasiness, not only to the President and Secretary of Treasury, but in the minds of those who have the management of all financial institutions.

Some months ago we ventured to state our opinion in *The Iron Age* that not less than \$72,000,000 were expended by Americans in European travel.

This large amount was criticised by some persons as being an extravagant estimate, but since that date we notice that an estimate of from \$8,000,000 to \$10,000,000 greater has been given by an almost indisputable authority, a New York banking house.

Gold shipments represent what is not only necessary to liquidate these large drawings, but all trade balance that may accumulate against us.

We were able to retain gold in this country during the fiscal year 1891, owing to the balance in our favor, but in the year 1892 the decrease in exports is estimated at over \$100,000,000, and during the month of January, 1893, the decrease in export of breadstuffs and cotton alone is estimated at about \$26,000,000 less than in 1892, and \$13,000,000 less than in 1891. Add to this a further increase of indebtedness, owing to our importation of foreign merchandise during the months of January and February, which have been largely in excess of January and February 1892; the excess importation in January alone was over \$10,000,000, with an estimate in February of from \$8,000,000 to \$10,000,000. By adding the increase of importation to the decrease of exportation it will readily be seen that the difference in trade balance for January alone will reach about \$36,000,000, and February perhaps from one-third to one-half less. The estimate for the two months being between \$54,000,000 and \$60,000,000. It will thus readily be seen how we stand.

The difference, therefore, must be paid in gold, as foreign countries do not want our silver. Its value is entirely too uncertain, and they have no law compelling its absorption.

Besides, during the last few months, Europe has been a seller rather than a buyer of our securities, which formerly brought either return gold, or what was counted equally good in our Clearing House system, foreign exchange.

The spasmodic buying of Reading stocks by London representatives made but a slight difference of a few millions of dollars, and thus, the demand for drafts of exchange being far in excess of the supply, gold is naturally demanded to make good the difference.

The Government cannot prevent our sending abroad an order for \$20,000 worth of Cutlery, nor prevent our using a check, for a statement now on the writer's desk, for a bill of exchange in payment of the

same, nor the exporting of gold to meet this bill of exchange, drawn by our bankers.

Our Government cannot change the conditions of a foreign country, whose hardships and struggles during the past year have prevented their buying from us, as a firm, as much as usual. If it cannot prevent individuals, neither can it prevent collectively as a nation.

The unprecedented prosperity of our country has induced large importations from abroad. Depressed conditions abroad have reduced the price on many goods, the advantage of which has been taken by buyers in this country. Hence the increase of imports in January are the largest on record for the same month.

The present generation can scarcely realize how depressed conditions could prevent consumption of a staple article like flour, yet the depressed conditions abroad have greatly reduced the consumption of food. Were it otherwise the demand for our gold would be less active.

These conditions have given sensational journalists an opportunity to mislead their readers. Many of these articles are as visionary and absurd as they are mischievous in sentiment.

It is a remarkable fact that no reasons have been given or any figures shown which would enlighten their readers as to why our Government is losing gold. Figures might mystify the writers of these sensational articles, and intimations of Government bankruptcy answers their purpose better. Notwithstanding the fact, they might easily produce mischievous results, and there is no knowing to what extent these misleading articles may have affected industrial enterprises, like the Pottstown Iron Company, and more recently, Cofrode & Saylor (Incorporated), which latter may possibly carry others with them, and prevented their securing immediate funds, the result of which was they were forced to go to the wall.

Neither is it known to what extent sensational and unjust criticism affected the recent monetary conference in Brussels, in which there was a laudable desire, not only of our Government, but our representatives, to solve money values.

This coming at a time when France, Germany, Russia and Austria were all offering extraordinary inducements for gold, which, as fast as secured, they were locking up for further contingencies whose opportunities were largely favored by the balance of trade against us.

It is natural to infer that the difference in exchange balance will change at an early date, as orders for foreign goods have been mostly supplied, and there are probabilities of European houses being compelled at an early date to call for our wheat and cotton.

But to adjust these balances, there is only one or more of four essentials: 1. Greater export demand for what we have to sell. In this our own Government is powerless. 2. Less importation of foreign merchandise, which would be increased rather than diminished in reduced tariff duties; but no present legislation is likely to effect this second.

The only other two ways open, therefore, would be the temporary uncertain

expediency of selling bonds, drawing higher rate of interest than is obtainable in foreign countries upon equally good security, in order to attract European buyers to tide us over the present unequal exports *vs.* imports, or else cease to uphold the price of silver by absorbing it in our Government vaults. This will permit the balance of trade to be paid for in gold, or, if preferred, silver at what it is worth in other markets than our own.

The Sherman Silver bill was an improvement over the former Bland bill at the time it was enacted, but conditions changed and we are not able as a Government to adopt a financial policy which will last for all times with all other nations against us.

It is expected that the low prices of wheat, corn and pork in this country, upon the advent of spring, will attract foreign buyers, and the partial resumption of cotton operations in Lancashire may call for larger exports of cotton.

The great changes in securities referred to have made quite a difference in the surplus of our own as well as New York banks. It is estimated that the surplus reserve has fallen in the two cities about eight millions, and discounts on paper are held from $\frac{1}{2}$ to 1 per cent. higher, with a closer scrutiny of the paper discounted.

Portland, Ore.

CORBETT, FAILING & ROBERTSON.—At last we are advised of the long expected change in transcontinental railroad rates. That there is general dissatisfaction all around is putting it very mildly. Spokane, the one point that was to be benefited beyond all others, is the one that is the hardest hit. In that territory all the surrounding towns secured the same rate as Spokane itself. The terminals Seattle, Tacoma and Portland like it no better, as, until the railroads make a lower rate into the interior, we are debarred practically from the territory where for a long time we have had a large trade. What the outcome will be or whether we will be able to bring any pressure to bear that will alter existing rates we cannot at present predict.

Trade has been quiet, owing to the uncertainty concerning railroad rates and the unfavorable weather. In the last few days, however, there has been a change for the better, and it is to be hoped that the improvement will continue. Prices show a considerable change in staple goods like Nails and Barbed Wire, both selling at lower prices than ever before in this market.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—There have been but few changes in prices of late. Barb Wire is firm at the low prices that have prevailed, and Nails have been holding very firm. Prices on both articles have been so low that they must improve, at least in firmness. Our jobbers have just adopted the New Steel Nail card, which will be a large convenience.

Trade has been rather quiet, being less than last year in same months, and it is expected that this feature will continue during the first half of the year. Trade is not unusually dull for the season, but last year it was very active, and this year is not above average.

Collections are hardly up to average but are fully as good as expected.

One of our wholesale grocery houses—the Beaupre Mercantile Company—has made an assignment, but it has been known that its affairs have been in bad shape for several years, and so the present situation does not occasion much surprise here.

Omaha.

LEE-CLARKE-ANDRESEN HARDWARE COMPANY.—Since our last report the weather has moderated considerably, and in consequence outdoor work has received prompt attention, evidenced by the steadily increasing volume of business.

So far this year business is holding up to a high standard of activity, and shows already a handsome gain over the same period last year.

Conditions in the country are quite satisfactory and collections are holding up well for the season of the year. The best country trade is almost without exception meeting obligations promptly. Merchants who have visited the city during the past two weeks uniformly report a good retail business right along, with prospects of an excellent spring trade near by, and as soon as the season is far enough advanced to admit of the opening up of building operations and other warm weather operations, which will afford work for a greater number of mechanics and laboring men, more money will be put into general circulation.

Prices of all goods in the Hardware line remain remarkably steady. The market on Wire Nails has slightly advanced, owing possibly to the heavy demand and to the fact that competition among manufacturers had reduced the price to a profitless point.

Barb Wire is steady and firm with a heavy demand, and as the season advances we look for a higher notch in values, and our only surprise is that the present low price has not hardened before this date. On both of the above staples the market is evidently in buyers' favor.

San Francisco.

HUNTINGTON-HOPKINS COMPANY.—Rains in this section have been abundant recently, but the weather is now becoming settled and an improvement in trade is to be noted. Collections are also in better condition than they have been for some time past. The tone of the market in the matter of prices is quite firm.

Notes on Prices.

Cut Nails.—The adoption of the Wire-Nail card by the Eastern manufacturers at their meeting at Philadelphia, 21st ult., ratifying the action of the Western manufacturers at the Pittsburgh meeting, 15th ult., is generally regarded by the trade with approval. The object sought to be accomplished—namely, the doing away with the troublesome system of averages and simplifying business by the use of a common list for both Wire and Cut Nails—is commended very heartily, and hopes are expressed that the project will be successfully carried out. Quotations in the East are on a basis of \$1.25 in carload lots at mill, and \$1.40, New York, which is

slightly higher on usual assortments than the price recently ruling. Manufacturers both East and West are making quotations on the basis of the new card without any reference to average, but specify in some cases that the price named is for "ordinary assortments," one company stating that their future quotations "will be made at a straight base price with the single condition that the quotation is made for ordinary assorted specifications." It is also understood that at the meeting of the Eastern Association last week it was stipulated that no order would be considered assorted unless it averaged as high as 10d Nails, or 50 cents per keg above base.

In adopting the Wire-Nail card for Cut Nails the Eastern manufacturers, as mentioned in our last issue, made some slight modifications so as to adapt it more fully to Cut Nails, and it is understood that these changes will be ratified by the Western manufacturers. The modifications made are shown in the lists given below, which represent the regular Wire-Nail card, and also that adopted by the Cut-Nail manufacturers. It will be observed that the Cut-Nail card differs from the regular Wire-Nail card, in the extras named on Fine Finishing, Clinch, Tobacco and Flooring Nails, as it provides for Nails omitted on the regular Wire-Nail card, while it increases the extras on Clinch Nails to 50 cents above the same size of Common Nails, instead of about 20 cents. Other changes are also made. On the leading goods, however, the two cards are identical, and these minor differences will probably be of little practical importance. We give below the regular Wire-Nail card and that adopted by the Cut-Nail manufacturers in parallel columns, so that the precise differences may be perceived at a glance:

Common, Fence, Sheathing, Hook, Brads and Shingle.	Extras.	
	Cut Nails.	Wire Nails.
	Base	Base
60d.....	\$0.10	\$0.10
50d.....	.35	.25
30d and 40d.....	.35	.35
20d.....	.45	.45
12d and 16d.....	.50	.50
10d.....	.60	.60
8d and 9d.....	.75	.75
6d and 7d.....	.90	.90
5d.....	1.20	1.20
3d.....	1.60	1.60
2d.....		
Casing and Box.		
30d and 40d.....	.40	.40
20d.....	.50	.50
12d and 16d.....	.60	.60
10d.....	.65	.65
8d and 9d.....	.75	.75
6d and 7d.....	.90	.90
5d.....	1.10	1.10
4d.....	1.25	1.25
3d.....	1.50	1.50
2d.....	1.75	1.75
Fine Nails and Fine Blued.		
2d.....	1.90	1.90
3d.....	1.60	1.60
4d.....	1.25	1.25
Common Barrel and Barrel.		
$\frac{3}{4}$ inch.....	2.00	2.00
$\frac{7}{8}$ ".....	1.75	1.75
1 ".....	1.50	1.50
$1\frac{1}{8}$ ".....	1.40	1.40
$1\frac{1}{2}$ ".....	1.20	1.20
$1\frac{3}{4}$ ".....	1.00	1.00
$1\frac{7}{8}$ ".....	.90	.90
Slating.		
2d.....	1.40	1.40
3d.....	1.20	1.20
4d.....	1.00	1.00
5d.....	.90	.90
6d.....	.80	....

Clinch.		
1 inch.....	2.10	1.80
$1\frac{1}{4}$ ".....	1.70	1.40
$1\frac{1}{2}$ " and $1\frac{3}{4}$ inch.....	1.40	1.00
$2\frac{1}{2}$ " " $2\frac{3}{4}$ ".....	1.25	.90
$2\frac{1}{2}$ " " 3 ".....	1.10	.80
3 ".....	1.00	.70
$3\frac{1}{4}$ " and $3\frac{1}{2}$ inch.....	.95	.60
4 ".....	.85	.50
Cooper, Tobacco and Warehouse.		
3d.....	1.30	....
4d and 5d.....	1.00	....
6d and 7d.....	.85	....
8d.....	.70	....
10d.....	.60	....
Tobacco Manufacturers' Box.		
3d caddy.....	1.60	....
4d and 5d caddy.....	1.20	....
4d and 5d lining.....	.90	....
6d and 7d.....	.75	....
Flooring.		
6d and 7d.....	.90	.75
8d and 9d.....	.75	.60
10d.....	.65	.50
12d and 16d.....	.60	.45
Common Brads.		
2d.....	1.60	....
3d.....	1.20	....
4d and 5d.....	.90	....
6d and 7d.....	.75	....
8d and 9d.....	.60	....
10d.....	.50	....
12 and 16d.....	.45	....
20d.....	.35	....
30d and 40d.....	.25	....
50d.....	.10	....
60d.....	Base	....
Finishing.		
2d.....	1.75	....
3d.....	1.50	....
4d.....	1.25	....
5d.....	1.10	....
6d and 7d.....	.90	....
8d and 9d.....	.75	....
10d.....	.65	....
12d and 16d.....	.60	....
20d.....	.50	....
30d and 40d.....	.40	....
Smooth Finishing.		
2d.....	1.90	....
3d.....	1.65	....
4d.....	1.45	....
5d.....	1.25	....
6d and 7d.....	1.10	....
8d and 9d.....	.90	....
10d.....	.75	....
12d and 16d.....	.65	....
20d.....	.60	....
Fine Finishing.		
1 inch.....	1.90	....
$1\frac{1}{4}$ ".....	1.65	....
$1\frac{1}{2}$ ".....	1.45	....
$1\frac{3}{4}$ ".....	1.25	....
2 " and $2\frac{1}{4}$ inch.....	1.10	....
$2\frac{1}{2}$ " " $2\frac{3}{4}$ ".....	.90	....
3 ".....	.75	....
$3\frac{1}{4}$ " and $3\frac{1}{2}$ inch.....	.65	....
4 ".....	.60	....
Lining Nails or Light Barrel and Lining.		
$\frac{3}{4}$ inch.....	2.50	....
$\frac{7}{8}$ ".....	2.20	....
1 ".....	1.90	....
Roofing.		
$\frac{3}{4}$ inch.....	2.00	....
$\frac{7}{8}$ ".....	1.75	....
1 ".....	1.50	....
$1\frac{1}{8}$ ".....	1.40	....
$1\frac{1}{4}$ ".....	1.20	....
$1\frac{1}{2}$ ".....	1.00	....
$1\frac{3}{4}$ ".....	.90	....
Hinge Nails.		
4d.....	1.50	....
6d.....	1.25	....
8d.....	1.00	....
10d.....	.90	....
12d and 16d.....	.85	....
20d.....	.80	....
Cut and Wire Spikes.		
.....	.50	.50
Boat Spikes.		
.....	.75	....
Chicago, by Telegraph — Manufacturers		
report large shipments during the past week, as specifications have been coming in rapidly on old contracts. The new price of \$1.42 $\frac{1}{2}$, Chicago, for factory lots with no average is maintained, but buyers are withholding their purchases as long as possible to see whether the rate is firmly		

fixed on this basis. Jobbers report that the rate of \$1.50 from stock on the new card is adhered to, and that so far they have met with no trouble in putting the new arrangement in operation.

Wire Nails.—During the past week or two there has been a large business in Wire Nails, some of the leading jobbing houses having placed heavy orders, and many smaller concerns covering their future requirements. The market is characterized by an excellent tone and prices are somewhat higher. At a meeting of the manufacturers held in Cleveland last Friday the price was advanced to \$1.50 for round lots at mill. Small lots from store in New York are selling at \$1.75 to \$1.80.

Chicago, by Telegraph.—Heavy contracts were made during the early part of last week by merchants in the Northwest, who at last became convinced that prices of Wire Nails were on a firm basis and that it would no longer be advisable to defer their necessary purchases of stock. Those who did so were wise, as manufacturers held a meeting later in the week and advanced prices to the equivalent of \$1.65, Chicago, for factory shipment. The advance is likely to be sustained now, as manufacturers are loaded with contracts. Stocks are reported light everywhere in the hands of distributors, and the usual spring demand is expected to reach larger proportions than ever. Jobbers have advanced prices to \$1.70 on small lots from stock.

Barb Wire.—The Barb Wire market is characterized by an excellent tone, with a large and increasing volume of business. Some of the mills are withdrawing their extreme quotations, and prices are somewhat higher than they have been. For carload lots at mill \$2.40 to \$2.45 represents the market, but some of the manufacturers are asking higher figures. Small lots of Galvanized Four Point from store in New York are regularly held at \$3.10, an abatement of 10 cents per 100 pounds being made in carloads.

We are advised by George H. Munroe, receiver, that he has booked orders and closed out the entire stock of Barb Wire of the Joliet Enterprise Company, there being less than 1000 kegs now in the warehouse, which will all be shipped not later than 15th inst. Sixty days ago there were nearly 4000 tons on hand. The Wire has been sold largely to old customers of the Joliet Enterprise Company and at fair prices, the receiver having taken special pains not to demoralize the Barb Wire market while closing out this stock. The plant has not yet been offered for sale.

Chicago, by Telegraph.—The demand is now quite large from manufacturers, and is improving from jobbers. Inquiries are coming forward in constantly increasing volume, and the question will probably be in a couple of weeks to the manufacturers: "Can you ship the Wire?" A very heavy trade is expected from all indications. The high grade Barb Wires sold through exclusive agencies will be advanced, it is stated, at least 10 cents per 100 pounds this week to, say, \$2.75 for Galvanized

and \$2.35 for Painted, in carload lots from factory. An advance on other Wire is regarded by manufacturers as a decided probability within the next week or two. Jobbers are now quoting \$2.65 for Galvanized and \$2.25 for Painted in small lots from stock.

Wrought Iron Pipe.—The volume of business is fair, but the market is weak and manufacturers are apparently very desirous of securing orders, and to this end are naming concessions on former prices. Quotations now ruling are, we are advised, lower than have prevailed for the past 18 months.

Shot.—The Shot market continues without important change, prices being steady, with only a moderate business. The Philadelphia Shot Tower, Thomas W. Sparks, 121 Walnut street, Philadelphia, in sending out their regular quotations state that an additional discount of 2½ per cent. will be allowed on lots of 2000 pounds and upward.

Cork Screws.—Detroit Cork Screw Company, Detroit, Mich., issue a list of Cork Screws and Cork Extractors manufactured by them, from which it is seen that the line covers a large range both in styles and prices. The list prices are as follows and subject to a discount of 33½ per cent. :

	Per doz.
Davis Knife and Cork Screw.....	\$2.00
Davis Cork Screw.....	6.00
Columbus Power Cork Screw.....	3.60
No. 1 Cut-Worm Cork Screw.....	1.50
No. 2 Cut-Worm Cork Screw.....	1.00
No. 3 Cut-Worm Cork Screw.....	0.75
No. 3 Greely's Cork Extractor.....	1.50
No. 4 Greely's Cork Extractor.....	1.80
No. 6 Greely's Cork Extractor.....	2.50
No. 7 Greely's Cork Extractor.....	2.50
No. 8 Greely's Cork Extractor.....	2.50
Puddefoot Cork Screws.....	3.00
Cut-Worm Screws for Bar Cork Pullers, per 1000.....	90.00

Chicago Spring Butts.—Chicago Spring Butt Company, Chicago, Ill., have recently reduced the list prices of their Nos. 41 and 51 Double Spring Butts. The revised list is as follows, which is subject to a discount of 30 per cent. :

	Per pair.
¾ to 1-inch, Nos. 41 and 51.....	\$7.25
1½ to 1¾-inch, " ".....	8.00
1¾ to 1½-inch, " ".....	10.75
1½ to 2-inch, " ".....	18.00
2½ to 2½-inch, " ".....	27.00
2½ to 3½-inch, " ".....	36.00

Motley's Adjustable Sash Holder.—This article, which is manufactured by Peter Motley, 750 South Broad street, Philadelphia, is sold, medium size, in gross lots, at \$1.50 per dozen; subject to a discount of 40 per cent.

Glass.—The glass market is quiet and uninteresting, with but little doing in either American or imported Window Glass. This is largely due to the severe weather experienced throughout the country, which has almost entirely caused the suspension of building operations. At a meeting of the National Window Glass Company, held at Chicago, last week, a change was made in the discount for Glass in any quantity less than carloads. The revised price for less than carloads is 80 and 10 per cent. discount, instead of 80 and 10 per cent. discount for 100 boxes and over, and 80 and 5 per cent. discount for less than 100 boxes, as formerly. Dis-

counts on other quantities remain unchanged. A freight allowance will, however, be made on carload lots and larger quantities, not to exceed 17½ cents per 100 pounds. Less than carloads will be sold f.o.b. at the shipping point. We are advised that the National Window Glass Company now include 93 per cent. of the Pittsburgh, Western and New York State factories, and 90 per cent. of the Glass jobbers in the country. The New York importers of Window Glass held a meeting on the 27th inst., but came to no decision regarding future prices. While the nominal discount on imported Glass is 75 and 10 per cent., in the absence of business no definite price can be named. Glass is, however, being sold at from 80 to 80 and 5 per cent. discount. The Plate Glass market remains without change, both in regard to prices and demand. We quote as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads 80 and 10 per cent. discount. Freight allowed on car lots and over, not to exceed 17½ cents per 100 pounds; less than car lots, f.o.b. at shipping point. French Window Glass, 80 per cent. discount to 80 and 5 per cent. discount. American Plate ranges in price from 60 and 2½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Export Notes.

THERE HAS RECENTLY been prepared for exhibition at the Columbian Exposition at Chicago, under the supervision of the Intercontinental Railway Commission at Washington, a relief map 25 feet long and 18 feet wide, showing the physical features of a large portion of the Western hemisphere. It covers all that section between 30° north latitude (practically a line drawn through St. Augustine, Pensacola, New Orleans and Galveston, United States) and Cape Horn, and extending as far west as the 100° of longitude west of Greenwich, or, in other words, a line running through the City of Mexico and taking in all east of it in Mexico, and all of the West Indies, Central and South America. The horizontal scale is 25 miles to 1 inch, and the vertical scale 20 times the horizontal. On the model referred to will be shown the route of the proposed intercontinental railway and the railroads already constructed, together with existing steamship lines. All important features—including mountains, plains, valleys, lakes, rivers, cities, &c.—will be depicted in their proper places, and the line of road will be represented by bright Wire.

It may not be generally known that some enterprising representative manufacturers are maintaining an export headquarters in this city at 56 New street, exclusively for foreign business, in charge of W. J. Kingsland. The markets to which especial attention is being given are those of the South African and Australian colonies, including New Zealand.

Mr. Kingsland was for years with Hibbard, Spencer, Bartlett & Co. of Chicago, an acquaintanceship with whose stock should afford a comprehensive knowledge of general Hardware. For eight years following 1883 Mr. Kingsland resided continuously in Australia, developing trade. At the address given above there has been prepared a suite of rooms, where samples of the productions of the several makers are suitably displayed, so that foreign or local buyers and commission merchants may see the various articles as prepared for market. This is essentially an information bureau, where questions may be asked and properly answered by those conversant with the intricacies of export trade or quotations given, although it is preferred orders should be sent direct to the several concerns, by whom the goods are shipped and charged direct. This does not in any way interfere with or antagonize commission houses having connections in this country, but rather where a representative line of goods of many makes may be seen under one roof and catalogues, literature, &c., obtained and inquiries receive prompt and intelligent attention by those who have made a study of the subject. Among the concerns represented may be mentioned the following: Henry Disston & Sons, Fayette R. Plumb, Travers Bros., Whittington & Cooley Mfg. Company, Plumb, Burdick & Barnard, Buffalo Forge Company, Hussey, Binns & Co., Morse Twist Drill and Machine Company, H. D. Smith & Co. and W. W. Woodruff & Sons.

Collis P. Huntington has confirmed the report that two large ocean vessels would be built by the Southern Pacific Railroad Company for service between New Orleans and Liverpool, adding that the contracts have been prepared but not signed. The two steamships, he says, will be followed by others of a similar character.

At a meeting of the Fair Trade Club, held in London February 8, James W. Lowther, Parliamentary Secretary of the Foreign Office in the last Salisbury Cabinet, and Howard Vincent made speeches. Mr. Lowther said protection was making rapid progress in favor among Englishmen. Mr. Vincent said that the McKinley tariff had, in 1892, increased the exports of the United States by £34,000,000 and the imports by £40,000,000 (or approximately \$170,000,000 and \$200,000,000, respectively). At the same time England's exports had fallen off £36,000,000.

Ninth Anniversary of the Philadelphia Hardware Association.

THE NINTH ANNIVERSARY of the Philadelphia Hardware Association was celebrated by an entertainment and dance on Thursday evening last at the Young Mannercher Hall, Sixth and Vine streets. The attendance was large and the affair a marked success. In the course of the evening E. H. Shannon delivered an address explaining the objects of the association and its benefit to the trade by its endeavors to overcome hurtful animosity and unfriendly competition, and the opportunities it afforded for the timely discussion of interesting trade sub-

jects, and its assistance in finding positions for the worthy unemployed.

Trade Items.

HAYDOCK & BISSELL, 12 Murray street and 15 Park place, New York, call attention, among the Special Notices, to an important auction sale on Tuesday, March 7, when a large assortment of Agate Blue and White Ware and Stamped Tinned Ware Seconds will be offered by order of the Lalance & Grosjean Mfg. Company. First quality Enameled Sheet Steel Drip Pans and Wrought Steel Kitchen and Pantry Sinks, enameled, galvanized and painted, will also be disposed of. The above goods will be sold in quantities to suit the jobbing and retail trade and without any reserve.

WE ARE ADVISED by an Ohio Hardware house that some of the jobbers are selling Steel Goods at discount 70 and 10 per cent., delivered. In view of the low price named they investigated the matter and found that in every instance where these low discounts have been made it was for goods under special labels, and that the goods were second quality, but billed on the first quality list. This is a course which has been pursued by some jobbing houses for some years, and it will be well for retailers who are desirous of handling good goods to look into the matter carefully.

F. G. FERAUD, for many years cashier of the Peck, Stow & Wilcox Company in New York, but since 1887 a resident of California, has recently been elected secretary of the Redlands Electric Light & Power Company, of Redlands, in that State, a town of 4500 population, about 60 miles from Los Angeles. This is in addition to other duties, among which may be mentioned the cashiership of the National Bank there, and an executive position in an irrigation company.

McFARREN & SHUTTS is the style of a firm who have recently commenced business at Hornellsville, N. Y. The stock carried will include House-Furnishing Goods, Glassware, &c.

CHARLES F. BROOKER, for 24 years secretary of the Coe Brass Mfg. Company of Torrington, Conn., has been elected president of that company to fill the vacancy caused by the death of Lyman W. Coe.

THE SALEM NAIL COMPANY, O. Nelson, proprietor, 292 Pearl street, New York, issue a card under date February 10, in which they state that, having anticipated the recent advance in the price of Cut Nails and having excellent facilities and a commodious warehouse, they are in a position to fill orders promptly at the lowest market prices. They mention that they always carry a full line of Plain and Galvanized Wire and Cut Nails.

ANNOUNCEMENT is made that the partnership heretofore existing between E. H. Berry and S. T. Frost under the name of Berry & Frost, Toms River, N. J., has been dissolved by mutual consent. All liabilities against the above firm are assumed by and all accounts due are made payable to E. H. Berry, who will continue the business at the old stand.

LOCKWOOD-TAYLOR HARDWARE COMPANY, Cleveland, Ohio, issue a circular in which they announce the resignation of W. C. Talmage as director in the company, and state that his untiring industry, careful attention to details and wise counsel in his more than 20 years' connection with the house have contributed materially to its prosperity, and that his resignation is accepted with great reluctance and only because his own interest seems to demand it. Mr. Talmage also takes occasion in the circular to acknowledge his gratitude to his friends in the Hardware trade and reciprocates the expres-

sions of appreciation and good wishes of his former associates.

THE WHITING PATENT CUPOLA manufactured by the Detroit Foundry Equipment Company, Detroit, Mich., is illustrated in their advertisement on another page, some testimonials being also given concerning it. The company call attention to the fact that they are designers and builders of improved Cranes, Ladles, Tumblers and complete foundry outfits.

W. O. JACOBS, Danielsonville, Conn., decorated his show window on Washington's birthday in a patriotic manner. A picture of Washington hung against the American flag as a background, and in the window was arranged a collection of articles as curious and interesting as they are unique and rare, contributed by a number of the citizens, among which were: Drum captured at the battle of Trenton in 1775, also a Queen's arm; powder horn made by a prisoner on board a vessel in Boston Harbor in 1776, also a flint lock used in 1812; large wooden eagle made with a jack knife by a prisoner in the old Windham jail in 1812; Turnkey used for pulling teeth; Iron Kettle brought over in 1640; Pitcher over 100 years old, Rocking Chair over 75 years old, Mortar and Pestle a century old, old-fashioned Waffle Iron, Foot-Warmer, Spinning Wheel, relics from battle-fields, and many other articles and pictures. Also a 10-shilling shin-plaster issued in 1773 was exhibited, on which are the words "To counterfeit is Death."

THE BROWN DEVELOPING COMPANY, 97 Chambers street, New York, and 45 Oliver street, Boston, have been carrying on a test of their Crematory Furnace at Boston, consuming the city garbage. During the test the temperature at the head end of the furnace was 2500°, at the rear end 1800°, and at the neck of the stack 1650°. A 45-inch stack was substituted for the 20-inch one in use, which it was expected would carry the temperature from 500° to 800° higher. Of this company J. C. McCarty, of J. C. McCarty & Co., 97 Chambers street, New York, is secretary.

LOGAN, GREGG & Co., Pittsburgh, Pa., soon expect to move from their present quarters on Wood street to a new building on Seventh street, between Penn avenue and Duquesne way. The firm have occupied their present quarters since 1852 and other locations on the same street since 1831. Their new building has a frontage of 73 feet on Seventh street, and is 100 feet deep to an alley, upon which it has a width of 100 feet. The building is six stories high, constructed of iron, stone and brick. The house was founded by John T. Logan, father of the present senior member of the firm, in 1831.

E. JANSSEN & Co., Eureka, Cal., recently gave a formal opening at their new store, in the Carson Block. The store is handsomely finished in natural redwood and oak, with modern fittings, such as self-weighting shot and powder cases, wall cases with sliding glass doors for guns and sporting goods, &c. A handsome souvenir commemorative of the occasion was presented to each visitor.

OWENS, MITCHEL & Co., Maysville, Ky., has been succeeded by Mitchel & O'Hare Hardware Company, with a capital stock of \$12,000, which may be increased to \$30,000. The officers of the company are as follows: E. W. Mitchel, president; M. A. O'Hare, treasurer and manager. E. W. Mitchel, M. A. O'Hare, Thomas W. Mitchel and C. B. Pearce, Jr., are the incorporators of the new company.

J. C. McCARTY & Co., 97 Chambers street, New York, have been appointed agents for the Mann Edge Tool Company, Lewistown, Pa., who manufacture a full line of Axes in all patterns and designs.

SURPLESS, DUNN & ALDER, 97 Chambers street, New York, advise us that, notwith-

standing the severity of the weather throughout the country, trade continues good with them. They state that the factories which they represent are on nearly all lines unable to keep up with the demand, and several of them are now running overtime.

SMITH BROS. HARDWARE COMPANY, Columbus, Ohio, have recently increased their capital stock to \$100,000. This was made necessary by the growing demands of their business and will enable them to carry a largely increased stock in all the lines in which they deal. All of the stockholders of the company are actively engaged in the business and are referred to as young men of great push and energy. The company were organized two years ago and have enjoyed a steadily increasing trade.

W. W. STALL, 509 Tremont street, Boston, Mass., gave their eleventh annual opening February 22. Among the wheels shown was the Stall Special, which is a high-class machine and is built only to order. Other machines exhibited were the Cleveland, Monarch, Dart, Hartford, Warren and Boston Safeties.

THE ATTRACTIVE two-page advertisement of the Russell & Erwin Mfg. Company, New York and New Britain, Conn., is deserving attention, illustrating as it does two of their newest patterns of the more elaborate designs in Store-Door Handles with Cylinder Locks, and also some of their new embossed bronze metal Knobs and Escutcheons. These additions to the line of artistic Hardware are of interest to the trade, not only in themselves, but as illustrating a tendency of the trade and an increasing demand for such goods.

MAN EDGE TOOL COMPANY, Lewistown, Pa., in their advertisement in this issue refer to the quality of Axes, and the prices which they are offered to the trade. The company mention that they make all patterns and styles of finish, both single and double Bits, overlaid and inserted Steel. The Axes of this company may be purchased at the best prices and terms from either of the following agencies: Wm. H. Cole & Sons, Baltimore; J. C. McCarty & Co., New York, and I. H. Amos, Portland, Ore.

THE FORGING SHOPS of the R. Loveland Axe Company, Lamar, Pa., were entirely destroyed by fire on Sunday afternoon, 26th ult. The company state that they expect to be able to supply their customers with Axes in time for the early fall trade. They have also some Axes in stock from which they can fill orders for immediate delivery.

Fishing Tackle.

THE TENDENCY toward Hardware merchants carrying larger and more completed assortments of Fishing Tackle is illustrated in a catalogue of 70 pages, 9 x 12 inches in size, issued by Farwell, Ozmun, Kirk & Co., St. Paul, Minn., devoted entirely to this line. It is evident that if merchants did not, in a measure, demand these goods in almost endless variety, wholesale houses would not deem it necessary to devote space and energy to their sale. The catalogue under consideration has an attractive fishing scene in colors on the front cover, followed by an alphabetically arranged index of contents on the inside of the same cover. Illustrations are given of Fishing Rods, Reels, Lines, Hooks, Flies, Trolling Spoons, Artificial Baits, Floats, Fishing-Tackle Boxes, Minnow Pails, Fly Books, Trout Baskets, Fishing Lamps, &c. Descriptions of sizes and prices accompany the illustrations.

Prize Competitions

\$25.00.

FOR MORE than six months Weekly Prize Competitions (\$10) have been an interesting and useful feature of the *Pharmaceutical Record*, a journal issued from this office and devoted to the interests of the drug trade. These weekly competitions have related to a variety of technical and business questions of interest to druggists, and have brought out a large amount of information of much service to the readers of that enterprising journal. In view of the success of this feature we have decided to announce a similar series of Weekly Prize Competitions on questions of interest to our readers, and invite a general participation on the part of the trade. As the object of these competitions is to obtain information which will be of practical service to our readers, and to discuss questions in which they are interested, we shall esteem it a special favor if any in the trade will suggest subjects for such competitions, which, if deemed suitable, we shall take pleasure in using.

In each competition there will be three prizes—a first prize of \$12.50, a second prize of \$7.50 and a third prize of \$5. The prizes will be awarded for the answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Prize Competition No. 14.

SUBJECT :

Suggestions Regarding the Sale of Spring and Summer Goods.

This competition is for the purpose of drawing out practical suggestions as to desirable methods in regard to the sale of spring and summer goods. Some merchants are negligent in regard to the matter, not giving it the attention it deserves, thereby losing trade, or defer attention to it until too late to do a good business in this line.

Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers will be favorably regarded as meeting the purpose for which these competitions are announced.

Those discussing the subject are of course free to treat it as they think best, but the following points are suggested as deserving attention:

Putting carried-over stock in salable condition.

When should new stock be purchased?

Preparing room for season goods.

When should season goods be exhibited in the store?

Arrangement and display.

Methods for increasing last year's sales.

The following prizes will be awarded :

First prize\$12.50
Second prize 7.50
Third prize..... 5.00

Replies are to be received not later than March 25, 1893. They should be addressed as follows :

DAVID WILLIAMS,
96-102 Reade street,
New York.

Prize Competition No. 14.

Our Prize Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named :

No. 5. Closing March 4.

A Method of Securing a Reliable and Prompt Delivery of Goods.

No. 12. Closing March 11.

Arrangement of Pocket Cutlery.

No. 13. Closing March 18.

The Best Method of Changing a Credit into a Cash Business.

No. 14. Closing March 25.

Suggestions Regarding the Sale of Spring and Summer Goods.

Another subject will be announced in our next issue.

The Sercombe - Bolte Mfg. Company's Plant.

THE SERCOMBE-BOLTE MFG. CO., 355-357 East Water street, Milwaukee, Wis., established their Bicycle factory in February of last year, and although not a year old have already won a high reputation for the excellence of their products. They manufacture all parts of their machine, beginning with the seamless tubing imported from England and the Rubber Tires obtained from American makers. They occupy a building 60 feet wide by 130 feet deep, consisting of five floors and a basement. Their factory is stocked with the most improved machinery in the line of Drills, Planers, Screw Cutters, Milling Machines, &c., everything being driven by electricity. Separate motors have been placed on each floor, so that no belting passes from one floor to another. Brazing is done by gas heat under air pressure. Quite a number of power presses are used to shape different portions of the machines. A steam hammer has recently been put in place for forging the heavier parts. Their nickel-plating plant is claimed to be the largest in the State; it is located in the basement of the building. A great deal of work is done in this department for outside concerns in different lines.

The company aim to make the best machine possible. They use the highest grade of material and employ the most skilled workmen, subjecting every machine to the most rigid inspection before it goes out of their hands. Mr. Bolte is a most ingenious mechanic and has given a great deal of his time to the invention of devices in connection with Bicycles, which have proved to be not only very efficient, but also eagerly sought for by other manufacturers of Bicycles. A few of the leading features introduced by him are enumerated as follows: The Quick Repair

Clincher Tire, which was illustrated in *The Iron Age* January 19. An easily Adjustable Post for the seat and the handle bar. This Post is made of a solid bar of steel which slips up and down in the tube forming its support. At the top of the tube is a dog fitting into a groove cut lengthwise in the bar. A pressure of the thumb raises the dog and permits the bar to be easily taken out. Pressure on the top of the bar, as applied either by the weight of the rider on the seat or in the weight of his hands on the handle, causes the dog to press into the groove in the bar more tightly and prevents it from slipping. This is a remarkably simple device, but very efficient. Another neat device is a tube socket used at the points of union of the different tubes forming the frame. This socket is made of a piece of straight tubing, flanged out by dies in the shape of a silk hat. The rim of the hat is shaped so as to fit precisely over the tube to which connection is to be made, and the other tube fits in the top of this hat-shaped socket; all the parts are then brazed together in the usual way. The crank fastening is also a simple device, but remarkably well adapted for that purpose. Instead of boring a hole through the ends of the crank bar for the insertion of a cotter pin to hold the shaft in place, the ends of the crank bar are made to project beyond the shaft and are threaded for a nut. They are made with a slight spring, so that when the nut is screwed on them they clamp the end of the shaft tightly. The shaft is made almost y-shape, so that it will not turn in the opening. Everything is thus held tightly together without any of the parts being weakened. The saddle used in the company's machines is also the invention of Mr. Bolte and is made in such a way that every part of it forms a spring. Special machinery has been devised in many instances for the manufacture of parts peculiar to the factory. An ingenious machine for testing the sphericity of balls is among them. This machine instantly indicates any variation in the roundness of surfaces, or even in the weight of the balls which it is testing. It has just been perfected, after many months of careful trial and constant experiments.

The machines made by this company are known under the general name of Telegram cycles. The Sanger racer and the ladies' machine are the leaders; next come the Lightning Messenger and the Telegram light roadster for ordinary road purposes. The Sanger racer only weighs 24½ to 26 pounds, and is built to order for individual use. The ladies' machine is claimed to be the lightest on the market, weighing only 33 pounds, with dress guards and mud guards all in place. The company have established agencies in different parts of the country, but ship no machines on consignment. They have large contracts with other manufacturers for their patent rim and tires. The business of this company has grown so rapidly since their establishment that the present factory is hardly equal to their requirements, and increased facilities seem to be imperative in the near future. A new catalogue will soon be issued.

THE SHELBY STEEL TUBE COMPANY and the Shelby Cycle Mfg. Co., both of Shelby, Ohio, have been consolidated, the two concerns to be hereafter known as the Shelby Steel Tube Company. The capital stock has been increased to \$400,000; and at the recent election Capt. D. L. Cockley was re-elected president and B. J. Williams, secretary and treasurer. The output of the company in tubes is stated for last month as 160,000 feet, and when the plant is in full operation the output will be between 350,000 and 400,000 feet per month. They are employing now about 225 men with 30 benches in operation, and very soon this will be increased.

Cut Nail Card from the Jobbers' Standpoint.

THE following letter from a well-known house in Ohio discusses the question as to the desirability of a revision of the Cut Nail card, referring especially to the inconvenience suffered by wholesale houses who sell Nails to the smaller trade. Our correspondent points out the advantage it would be if the system of averages were abolished. Whether the adoption of the Wire Nail card for Cut Nails will accomplish this remains to be seen:

I read with interest a recent article in your paper on Cut Nail card. If the writer of the article had to sell Nails in a jobbing way to the retail trade I think he would sing another song. Jobbers cannot charge their customers on the same basis they have to buy on. Only last week we received the following order for Cut Nails:

6 kegs 40d.
3 kegs 20d.
4 kegs 60d.

This order was from a coal company who use scarcely any small Nails. The average above base is 5 cents a keg. Now, what would our customer say had we charged him the same rate manufacturers would charge on such an average? He would have returned the invoice for correction, and possibly added some exclamation points. A great many retail dealers are sharp enough to buy their large sizes from jobbers and small ones from manufacturers; in that way they can shape their stock so as to get a high average and low price when they are ready for a carload. There is no good reason why the loss on one-sized Nail should be added to another size. Manufacturers know what it costs to produce each size, and the only correct way is to sell each size on the basis of the cost of same. Why should a man who wants a keg of 50d Nails pay more than they are worth to help some one else buy a keg of 3d Fine for less than they are worth? And if the manufacturers' system is carried out, that is just what the buyer of the 40d will have to do. The jobber cannot fix a price based on exact cost on more than one purchase at a time. He may have a car this week with a high average and low prices, and the next car may cost him, on a different average, from 5 to 10 cents a keg more; but he dare not change his price unless manufacturers have made a change.

The average dealer knows nothing about the present system, and it would take one man's time to explain it to them so they would remember it. If they could take a Nail card and know the base price, they could tell exactly what Nails would cost them; and it makes no difference to them whether a customer buys 3d Fine or 60d, he makes his profit.

We would like to see a card so arranged that manufacturers could return to the old system, and think it would be fully as profitable to them and much more satisfactory to jobbers and retailers.

THE Craig-Reynolds Foundry Company have been organized to succeed the old-established business of Marlay, Craig & Co., Dayton, Ohio. The officers of the company are Zenas A. Craig, president, and H. N. Reynolds, secretary and treasurer. The directors are as follows: Zenas A. Craig, H. N. Reynolds, James A. Marlay, Charles F. Corns, Robert Craig and John R. Reynolds. The company call attention to their new plant with its excellent facilities for the prompt and satisfactory execution of all work intrusted

to them. They announce themselves prepared to make a general line of Gray Iron Castings, and guarantee that all work contracted for will be delivered with the utmost promptness. Every department in the plant has been thoroughly equipped and systematized, and the company are ready to name special figures on all work desired, large or small.

Manufacturing.

THE BETTENDORF METAL WHEEL COMPANY of Davenport, Iowa, are now running their works full time, turning out a great variety of Steel Wheels for farm machinery. They have recently turned their attention to Wheels for wagons, and are meeting with encouraging results in this direction. The Bettendorf process of manufacturing Wheels has begun some five years since under the patents of William P. Bettendorf, starting with a few hands in a small shop. The company now run large plants at Davenport, Iowa, and Springfield, Ohio, employing over 200 hands, and having a capacity of 800,000 to 900,000 Wheels annually. The Wheels are made with a malleable iron hub and steel spokes and tires. The spokes are fastened to the hub by special machines, which rivet the spokes on the inside and form a shoulder against the hub on the outside at one operation. Special riveting machines are also in use to rivet the spokes to the tires. Tire welding is done with gas furnaces and steam hammers as well as hydraulic presses. The company are now among the large consumers of steel, working up several thousand tons annually.

Slaymaker, Barry & Co., Lock manufacturers, of Lancaster, Pa., are transferring their plant to a new factory corner of West End avenue and First street, and expect to be in running order in their new factory about April 1.

The Champion Blower & Forge Company of Lancaster, Pa., have now ready for the market a new Upright Drill, which they propose to call their "1893." They claim that it will actually weigh 120 pounds, and will be the heaviest Drill for the price ever offered to the trade.

The Deal Lock Company of Akron, Ohio, have been granted a charter of incorporation, with a capital stock of \$20,000, for the manufacture of Locks and other Hardware specialties. The incorporators are J. J. Deal, H. K. Sauder, E. S. Day, H. G. Haynes, D. R. Bunn, I. Isabel, C. P. Humphrey.

Covert's Saddlery Works. Farmer, N. Y., advise us that their sales in both Neck Yoke goods and Saddlery and general Hardware specialties during the months of January and February have exceeded those of any corresponding period since they commenced business. They refer to the demand as quite equally distributed through the United States, with prompt payments, and hence prophesy a good year for business.

Erie Specialty Mfg. Company, Erie, Pa., were the recipients during 1892 of a largely increased trade, which has necessitated the enlargement of their plant and the addition of new machinery. The company are now running overtime, and the books contain many large orders, the prospect for business during 1893 being very gratifying.

H. A. Harvey, Augusta, Maine, is rebuilding his Hammer and Tool works at Pettingill's Corner, in that city, which will be larger and better equipped than before. The goods manufactured will be Stone Jacks, Derricks, Granite Tools, Chains, Bars, Picks, Bush Hammers and other fine tools connected with the granite, marble and brown stone trades, together with masons', blacksmiths', grist mills' and railroad prospectors' Hammers and Tools.

The U. S. Screen Mill, W. Randolph, Vt., which was destroyed by fire February

24, 1892, has been rebuilt and fitted with modern machinery and appliances for manufacturing Screen Doors and Window Screens. The buildings are referred to as being well arranged and all machinery and conveniences as of the best.

Referring to their Screen business, A. J. Phillips & Co., Fenton, Mich., report a very active demand for their goods, sales exceeding those of any other year. Their facilities have been increased so that they are able to make 5000 Screens per day, and they are now turning out that number of Screens daily in order to keep up with the demand. They expect to average 4000 Screens per day during the season. They advise us that they have made less effort than usual this season to secure new business, the main endeavor being to manufacture a sufficient stock of goods to supply the wants of their regular customers.

The Southern Malleable Iron Works, Chattanooga, Tenn., have started a new industry in connection with their plant. It is the manufacture of a high-grade Padlock under the patent of P. M. Reagan, formerly of Chicago. The Locks are referred to as very simple in their mechanism and a large sale is expected.

Job. T. Pugh, 3114-3120 Market street, Philadelphia, Pa., is putting on the market a line of new Hollow Chisels and Hollow Chisel Bits. The Square Chisel incloses a bit which is revolved, boring a hole, while the Chisel is forced forward, resulting in a square mortise being cut. These are for use singly or in gangs. The Standard Chisels carried in stock are made to fit Greenlee machines, though the manufacturers restrict themselves to no one machine.

Arcade File Works.

W. ALFRED WEED, the inventor of File machinery, has joined forces with the Arcade File Works, and has been elected vice-president and general manager of the company. He will shortly remove his shops to Anderson, Ind. It is stated that new inventions of Mr. Weed's will be introduced exclusively in the shops of the above works, and that these, together with the use of natural gas, will further improve the quality and temper of this well-known line of Files. The property at Anderson, Ind., upon which the company have recently erected buildings, includes 50 acres, with the factory located in the center. The grounds are laid out in plots, and are rapidly being covered with cottages and residences, all of which have natural gas throughout for light and heat. One of the factory buildings is 600 feet long, 40 feet wide, built of brick, stone and iron, with a slate roof, and designed to be practically fire proof. Hydrants are located at different points on the grounds, giving the works their own fire protection. The facilities will enable the works to produce over 2000 dozen Files per day. Machinery and tools are now being rapidly made to cover that product.

THE RHODE ISLAND PERKINS HORSESHOE COMPANY, Providence, R. I., are now carrying with their agents, J. C. McCarty & Co., 97 Chambers street, New York, a full and complete assortment of all sizes, patterns and weights of their Horseshoes, including toe weights, side weights, Good Enough patterns, &c. The line of Shoes made by this company is, we believe, more complete than that of any other manufacturers, and the trade will appreciate the convenience of being able to procure any of the goods at their agency as above.

Price-Lists, Circulars, &c.

REMINGTON ARMS COMPANY, 315 Broadway, New York: Remington Bicycles. Illustrations are given of the Light Roadster, the Roadster and the Ladies' Safety. The manufacturers call attention to the points of excellence in their wheels, among which are mentioned long wheel base, long head, crank hanger thrown well forward, Mannesmann tubing, roller chains, hollow rims; Bidwell, New York, belting, closure, and Morgan & Wright principle for tires; rubber or rat-trap pedals, cow-horn or straight handle bars. A circular contains hints on the care of cycle chains, and advocates the use of cycle chain Graphite, especially put up for the purpose.

THE ROGERS IRON COMPANY, Springfield, Ohio: Farm and Family Hand Grist Mill and the Bayley Hand Corn Sheller. The Mill is shown mounted in different styles and of different sizes, suitable for family, farm and ranch uses. The Mill is adapted for grinding corn, graham, coffee, spices, &c. The makers state that they have been careful to make these machines strong, durable, simple and at the same time effective and adapted to the work for which they are intended.

THE BRONSON SUPPLY COMPANY, New York, sole agents for Puritan Cookers: Illustrations and list prices are given of a variety of styles of Puritan Cookers, also of Five o'Clock Tea Kettles, Coffee Pots, Chafing Dishes, Baking and Vegetable Dishes, Egg Poachers, Cuspidors, Spice Nest, Tea Steepers, Universal Measures, &c.

THE ST. LOUIS REFRIGERATOR & WOODEN GUTTER COMPANY, St. Louis, Mo.: The Centennial Refrigerator. Illustrations are given of Refrigerators, Sideboard Refrigerators, Ice Chests, Grocers' Chests, Barroom and Saloon Chests, Wine Cooler Refrigerators, Portable Refrigerators, Grocers' Butter Boxes, Beer Coolers, &c.

THE TIE COMPANY, Unadilla, N. Y.: Holdfast Ties and Parcel Handles. The Holdfast Ties are made for shoe laces, cyclists, horses' tails, shawl straps, tennis nets, hammocks, clothes lines, bags, &c. The company also manufacture the Teller Kitchen Knife, a woman's invention for chopping potatoes while warming, turning griddle cakes, eggs, fish, omelets and for other uses.

THE LUDLOW-SAYLOR WIRE COMPANY, St. Louis, Mo.: Illustrated catalogue of Crestings, Finials, Stable Fixtures, Tower Ornaments, Weather Vanes, &c. In addition to these goods, the company call attention to all goods of this character, as well as to their general line of manufactured Wire Goods; also Barb and Plain Wire, Metal Work of all kinds, Wire and Iron Fences, Wire Nails, &c. Catalogues and prices will be furnished upon application by the company.

A. TREDWAY & SONS, Dubuque, Iowa: Spring Circular No. 11. February, 1893. Illustrations are given of Farm and Garden Implements, Lawn Mowers, Grindstones, Hay Carriers, Screws, Washers, Wringers, Scales, Lock Sets, Mechanics' Tools, Cutlery, &c.

STOKES MFG. COMPANY, Chicago: Sterling Cycles and Bicycle Sundries. Illustrations are given of the Sterling Double Diamond Frame; No. 4 Advance, both gentlemen's safeties. The Flash, ladies' safety; the Jewel and Leader, combination wheels. The company also make a specialty of Bicycle Sundries, carrying Clothing, Sweaters, Lamps, Shoes, Caps, Stockings, Bells, Oilers, Cement, Repair Outfits, Bicycle Stands, Pumps, Luggage Carriers, Parts, Saddles, &c.

THE AMERICAN BIT BRACE & TOOL COMPANY, Buffalo, N. Y., on a card illustrate their new Ratchet Ring and Braces on which it is used. The numbers of their Ratchet Braces are 18, 10, 12, 20, 22, 24 and 26. These are made in all sizes. The Braces without Ratchet are Nos. 11, 13, 19, 21, 23, 25 and 27. The makers state that no part of Nos. 18 and 19 braces can be detached or lost.

THE WORCESTER FIRE APPLIANCE COMPANY, Worcester, Mass.: The Worcester Chemical Pail, Chemical Fire Pail No. 2, the Protection Chemical Fire Pail, Non-Corrosive Fire Pail, the Macomber Force Fire Pail and the Macomber Chemical Automatic Sprinkler. A number of testimonials attest the value of these pails in cases of fire.

AMIDON TOOL CORPORATION, Buffalo, N. Y.: Amidon's Bit Braces. An illustrated catalogue and price-list shows Corner Braces, Ratchet Braces, the Improved Barber, Barker Improved, Cheap Barker, Amidon's Universal and Buffalo Rail Braces. Also, Amidon's Interchangeable Jaw Pipe Wrench.

A. B. KOCH & Co., Peoria, Ill.: Koch's Shiftable Reversible Brackets. These are designed for shelving stores, libraries, cupboards, &c. Wall plates are attached to walls or partitions, on which Brackets are attached. The plates are so arranged that brackets may be moved up or down, according to the space required between the shelves. Brackets are made from 6 x 8 to 9 x 21 inches in size.

NEWHALL SHIP CHANDLERY COMPANY, 105 Chambers street, New York: Awning Hardware. An illustrated catalogue devoted exclusively to this line includes United States Ensigns, Sheet and Cast Brass Grommets, Cutting Punches, Setting Dies, Swivel-Eye Awning Blocks, Awning Cleats, Slide Rods, Nut and Jaw Slides, Plate Hinges, Awning Hinges, Awning Feet, Awning Hooks, Sail Needles, Palms, Awning Frame Ends, Screw Eyes, Wood Screws, Thimbles, Snap Hooks, Bench Sail Hooks, &c. This catalogue is particularly desirable, combining, as it does, the line of Awning Hardware in a compact and convenient form.

NORTH BROS. MFG. COMPANY, Philadelphia, Pa.: Seasonable Helps for Household Use. Illustrations are given of Gem, Blizzard, American and Crown Ice Cream Freezers; Freezer Clamp, Ice Chipper, Keystone Beater, Gem Cake Pan, Gem Cake and Batter Mixer, Perfection Meat Cutter, Gem Ice Shave, &c.

PARAGON MFG. COMPANY, New Haven and New York; salesroom 112 Chambers street: Illustrated price-list. Cuts show Pipe Vises, Cast-Iron Hammers, Gas Plyers, Can Openers, Speed Indicators, Ice Picks, Brackets, Tack Claws, Coat and Hat Hooks, Tinnerns' Snips, Scratch Awls, &c.

The Frasse Company.

THE FRASSE COMPANY, successors to Frasse & Co., advise us that they will move from 92 Park row, which location they have occupied for over 50 years, to the large store at 19 Warren street, where they will be able to show a full line of machinists' and mechanics' Tools. Their trade has increased to such a degree that this move has become necessary to keep pace with their output. The store will be arranged to accommodate a line of Lathes, Planers, Shapers and other machinery, a specialty of theirs being Tools for bicycle repairing. They are importers of Grobet's Files, Stubbs' Tools, Files and Wire, Chesterman's Tapes, Rollason's Piano Wire, &c. The basement will be fitted up with racks for a stock of the celebrated Poldi Steel, for

which they are sole American and Canadian agents. This Steel is referred to by them as used for turning and planing hard castings and for work where tools made out of regular steels would not hold their edges.

Two Cases.

BY A. F. G.

MERCHANTS are induced, sometimes against their better judgment, to buy a sample of something outside of the line regularly handled by them, but still a legitimate Hardware article. In many cases such investments prove unprofitable, although merchants in adjoining towns are successfully selling the same goods, and find for them an increasing demand. The

SAMPLE ARRIVES,

is examined, and commented upon by the proprietor and clerks, and then perhaps laid on a cook stove or refrigerator. In the press of business, showing and explaining and selling such goods that are called for, the sample is forgotten. Some one in showing the stove or refrigerator to customers lays the sample on the floor; next morning when the sprinkling and sweeping is done, the sample is

SHOVED INTO A CORNER OR INTO A BIN,

or behind the counter. It is later covered with other goods, and not discovered until taking inventory, when its shop-worn condition unfits it for sale. The proprietor wonders, if he does not say it right out, why clerks are so careless. He is disgusted with trying new things, and has lost confidence in the salesman who induced him to buy the sample, and with traveling men in general. Unfortunately for the merchant, this was the last trip for the traveling man who sold him the article, or on his next trip he would probably have looked around and said, So you have sold that sample already. How did your customer like it? Thus the article might have been rescued from its ignominious end.

ANOTHER CASE.

Now the question arises, How did the other merchant in the adjoining town create a demand for the same kind of goods? We will suppose the article in question to be a Lifting Weight, an athletic apparatus for home use. When it was unpacked it was nicely dusted off, the accompanying description was read and thoroughly digested, and the machine given a prominent place for actual use. It was not put so high that no one could work it, nor where things would be piled up in front of it, but where any customer could try it and see how it worked.

SIGNS.

Then the merchant had the sign maker (who owed him) paint neat signs on cardboard, one for each of the show windows, stating that such an apparatus was on exhibition, and inviting customers to come in and try it, free of charge. Then he had another card made to hang in the store over the machine, giving its name and inviting people to try it.

TALKED IT UP.

When the merchant made his deposit at the bank next day, he told the clerks what a fine thing he had at the store for them, and they promised to come in that evening and see it. He put a flea in the ear of the young man in the cigar store, and gave a similar hint to his lawyer, and spoke to others whom he thought needed and would appreciate something at home upon which to exercise. It is unnecessary to follow in detail this merchant's subsequent trade in athletic goods, or to state how from this one machine his stock of this class of profitable goods increased until his store was considered headquarters for athletic goods for that region of country.

American Files.

IN ANSWER to an article which appeared in the *Engineering and Mining Journal*, in which American and foreign Files were compared, to the detriment of the former, J. D. Foot of Kearney & Foot Company writes to the *Scientific American* in part as follows:

A well cut American file will do just as much work and even more than a Grobet of the same cut. The English Stubbs Files have always had a good reputation, and while Mr. Pentz places their quality below the Grobet File, the real facts are the Stubbs Files are considered by nearly all File manufacturers, and also by nine consumers out of ten, to be of better wearing quality than the Grobet make.

Regarding the honesty of the steel used by File makers he remarks:

Quite recently a prominent engineer and large user of Files in France expressed his preference for American Files manufactured by the writer's company on the ground that actual tests had proved to his satisfaction that the quality of steel used in our American Files was better than the best English make.

He admits that Stubbs uses a better quality of steel in his Files than that generally used by English or American manufacturers, and states that the steel at present used here in the manufacture of Files is a comparatively low-priced steel, and yet fully as expensive as the steel used by any foreign manufacturer except Stubbs.

In his opinion the Nicholson File Company of Rhode Island, in the manufacture of their X F's, exceed in style and finish any maker of small Swiss Files. In conclusion, he takes exception to the statement as regards the uniform temper in a File of foreign make being better than the Files of the best American makers, and remarks:

Now and then in this country you will find a few machinists who still think they must have a Grobet File to finish with, a Stubbs Taper Saw File to improve the cutting qualities of a very hard Saw and an English File for general machine shop work. To such users I can only say that not only is the English market in Canada and other provinces of Great Britain being absorbed by the better make of American Files to day, but it is also a fact that in England, the home of some of the best Files made in the world for general machinists' uses, Files of certain American manufacture have not only entered that market, but gone there to stay, and have become formidable competitors of the best brands of English Files, Stubbs' not excepted.

Trade with Cuba.

THE ENGLISH CONSUL, RAMSDEN, at St. Jago de Cuba, reporting to Lord Rosebery on British trade with Cuba in 1891, writes that the American reciprocity treaty, which went into force July 1, 1892, will affect Great Britain seriously in the matters of Machinery and Hardware, and more particularly so in view of the duties proposed in the new Budget law for the island of Cuba on several of these articles. Comparisons are made concerning Sugar Estate Machinery, showing duties on goods of British origin as follows: Sugar-Cane Grinding Mills, equivalent to about 11.44 per cent.; Vacuum Pans, Defecators, Clarifiers, Tanks and Machinery pertaining thereto, &c., 7.80 per cent.; Centrifugals with their Engines, 10.60 per cent.; Steam Boilers, 56.90 per cent.; Cast-Iron Piping, 55 per cent.; Loose Pieces of Machinery, 31.52 per cent., and in some cases much more; Railway Iron 90 per cent.; Cane-Carrying Cars, 18.70 per cent. The exact duties are given of which the above are approximate equivalents in percentages calculated on cost. On all of the articles noted corresponding goods from the United States enter free. Railway Iron can no longer be sent from England, owing to the enormous duty of 90 per cent. on its value. In the matter of duties on Hardware from England the consul notes the following:

Pig Iron will continue to come from England, the duty being £1. 4/ per ton, and free from the United States. Large Cast-Iron Piping and Iron Columns can no longer be brought from England, the duty being £2. 6/8 per ton, while free from the United States. The importation of these goods was of considerable importance. Thinner Cast-Iron Piping is in a still worse case, the duty being £3. 13/4, and nothing from the United States. Ordinary Iron Castings, such as Stoves, Caldrons, Grates, and such like, will still come from England for the present, in spite of their paying no duty from the United States, and that from England being £4. 3/4 per ton. In the United States they do not at present manufacture the forms of these required by this market. It is an article of considerable importance. Fine Iron Castings, polished or lined with porcelain, have small importance for English manufacturers; the duty is £10. 3/9 per ton, against 50 per cent. reduction on those from the United States, but they will still come from Europe—say France and Germany. Wrought-Iron Bars and Steel, duty £3. 11/1 per ton. The United States will very soon compete in these articles, and Steel will come entirely from that country, with the exception of the extra quality used for tools. Sheet Iron of all kinds, duty £5. 6/ per ton; free from the United States. The cheaper kinds will for the present come from England, but the better qualities exclusively from the United States. Galvanized-Iron Sheets and Roofing and Corrugated Iron, duty £6. 18/6 per ton, with 50 per cent. reduction on that from the United States, will not be affected by the treaty. Wrought-Iron Piping, Nails, Rivets, Screws, Washers, Nuts, and such like, will come exclusively from the United States. Files, Iron and Steel Tools, and Implements for agriculture, arts and industries—the English market will be closed for these, with the exception of some specialties only made in England. Wrought-Iron Chains, Anchors, Wire,

Wire Rope and Wire Netting will be brought only from the United States. Fine manufactures of Wrought Iron and Steel, such as Spurs, Bits, &c., for the present will not be affected. Tin Sheets will not come from the United States, but the English article has to compete with that from Spain, which is now coming to this market; the Charcoal quality will still come from England. Knives, Penknives, Scissors, Razors and such like—the duty on these is so excessive that it will be impossible to import them; the cheaper kinds will come from the United States, or from Spain, and only the fine qualities from England. Sheet Copper and Copper Bars will still come from England. Small Copper and Brass manufacture, such as Screws, Rivets, Washers, Wire, Water, Gas and Steam Taps—these will, in future, all come from the United States. Tinmen's Solder will come from England. Zinc in Sheets and Bars, and manufactures thereof, will come almost exclusively from Spain. Glass Chimneys for Lamps pay a duty of about 600 times their value, with reduction of 50 per cent. on those from the United States.

A Barb Wire Reminiscence.

J. P. WARNER, now connected with the Washburn-Moen Mfg. Company, at Chicago, as head salesman, has had a long experience in the Barb Wire trade. Eighteen years ago this month, in January, 1875, he started to sell Barb Wire for the firm of Glidden & Ellwood of De Kalb, Ill., and was among the first to sell Barb Wire to a dealer. The Wire was Glidden Painted Two-Point. No attempt had then been made to sell galvanized Barb Wire. His first order was for 50 pounds at 15 cents a pound, and the purchasers were Adam Brothers, at Manchester, Iowa, who are still in business and have handled Glidden Wire ever since. The factory at De Kalb is now operated by the I. L. Ellwood Mfg. Company. The trade has undergone momentous changes in these 18 years, the most important of which is, of course, the tremendous reduction in price from 15 cents per pound to 2½ cents, although Mr. Warner is inclined to think that the introduction of Waukegan Wire to the trade is of nearly equal importance.

It Is Reported—

That the Hardware store of F. Meyer & Bros. Company, Peoria, Ill., was burglarized on the 13th ult. The value of the goods stolen was small.

That Wilson & Fisher, wholesale Hardware dealers, Cumberland, Md., have recently completed a four-story brick and iron building.

That Shellhouse & Co. have recently opened a Hardware store at 271 East Washington street, Indianapolis, Ind. They make a specialty of Builders' Hardware. They also handle a line of builders' supplies and have a large stock of paints, oils and glass.

That J. C. Moore has just opened a new stock of Hardware at 109 East Washington street, Indianapolis, Ind. Mr. Moore was for ten years in the Hardware business at Ohio City, Ohio.

That the Connor Hardware Company have been recently established at 79 South Illinois street, Indianapolis Ind. They will do a retail business in shelf and builders' Hardware.

That the tinsmith establishment of A. F. McCabe, Holbrook, Mass., was completely gutted by fire on the 20th ult., the loss being about \$5000. The loss is, however, fully covered by insurance. The cause of the fire is unknown.

That the store of T. J. Ulen & Co., dealers in Hardware, &c., Dexter, Mo., was destroyed by fire on the 9th ult.

That William H. Newman, formerly of Marlborough, N. Y., has bought the Hardware and Tin store of Hasbrouck & Hayden of Highland.

That John Sheehan will soon open a Store and Tinware store in New Britain, Conn.

That the Stout stock of Hardware, Topeka, Kan., has been sold by the bank in that place to Messrs. Ferguson and Sanford of Belleville, who have taken charge.

That the Chandler Hardware Company, Coldwater, Mich., are one of the corporations which have recently filed articles of association with the Secretary of State of Michigan. The capital stock is \$25,000.

That the old Hardware store of Ziegler & Schumacher, Scranton, Pa., is being remodeled, large plate glass windows and doors being introduced.

That the Hardware firm of Voorhees & Roberts, Wellsville, N. Y., have been dissolved. L. S. Roberts will continue the business under his own name.

That Charles F. Dahlberg, roofer and dealer in Stoves and Tinware, Brockton, Mass., will erect a new building, 40 x 60 feet, three stories high.

That the Hardware establishment of K. G. Potts, Renville, Minn., was destroyed by fire on the 5th ult.

That Orta Remington, of the Hardware firm of Moon & Remington, Marcellus, Mich., has sold his interest in the business to Elias Mohney of Flowerfield.

That A. J. Doherty and his brothers of Clare, Mich., have organized a stock company and will engage in the Hardware business at Coleman.

That Sanders' Hardware store at West Newton, Pa., was destroyed by fire on the 19th ult.

That the Star Hardware Company, successors to Schunk, Hillenkamp & Co., Toledo, Ohio, have elected the following officers: Frank Hillenkamp, president; George J. Grassenbacher, vice president; Robert Baur, secretary and treasurer. These persons, with George Shunk and H. A. Werdehoff, constitute the Board of Directors of the company. The capital stock of the organization is \$40,000.

That the Hardware firm of Lindsley & New, Oneida, N. Y., have dissolved by mutual consent, Mr. New retiring. Mr. Lindsley will hereafter carry on business in his own name.

Exports.

THE EXPORTS from the port of New York to foreign markets for the week ending February 18, 1893, exclusive of specie, amounted to \$4,772,244. The following are the exports of Hardware, Machinery, Metals and related goods. The items for Mexico include merchandise by seagoing vessels only:

Antwerp.—Agricult. Impts., \$420.—Belting, \$100.—Hardware, \$1125.—Electrical Matl., \$830.—Pumps, \$515.—Machinery, \$565.—Tacks, \$278.—Manufd. Wood, \$91.—Firearms, \$2435.

Argentine Republic.—Twine, \$18.—Pumps, \$705.—Oilstones, \$43.—Grindstone Fixtures, \$47.—Scales, \$520.—Sandpaper, \$165.—Manufd. Wood, \$379.—Cutlery, \$95.—Agricult. Impts., \$1114.—Tacks, \$1010.—Hardware, \$13,237.—Toilet Sets, \$150.—Saws, \$545.—Store Trucks, \$78.—Woodware, \$72.

Amsterdam.—Machinery, \$2500.—Pumps, \$17.

Azores.—Ox Balls, \$12.—Lamp Goods, \$40.—Machinery, \$760.—Clocks, \$185.

Africa.—Hardware, \$90.—Manufd. Iron, \$34.

Australia.—Lamp Goods, \$2489.—Manufd. Iron, \$3442.—Hardware, \$3354.—Twine, \$12.—Nails, \$358.—Pumps, \$443.—Tacks, \$30.—Carpet Sweepers, \$31.—Stone, \$101.—Grindstones, \$116.—Clocks, \$1588.—Wheels, \$600.—Tinware, \$142.—Machinery, \$860.—Axles, \$603.—Saws, \$221.—Agricult. Impts., \$2762.—Carriage Matl., \$8330.—Manufd. Wood, \$558.—Woodware, \$1081.—Wringers, \$171.—Firearms, \$1525.—Baby Cabs, \$315.—Scales, \$69.—Whips, \$180.—Cartridges, \$61.—Plated Ware, \$529.—Hose, \$48.—Electrical Matl., \$28.—India Rubber Goods, \$531.—Carts, \$80.—Springs, \$53.—Gas Fixtures, \$46.

British Honduras.—Hardware, \$51.—Copper, \$55.—Manufd. Iron, \$50.—Needles, \$2.—Fish Lines, \$30.—Cutlery, \$14.

Breslau.—Manufd. Wood, \$5.

Bordeaux.—Agricult. Impts., \$288.

Bradford.—Machinery, \$195.

British Possessions in Africa.—Pumps, \$40.—Wheels, \$5.—Machinery, \$12,830.—Clocks, \$750.

British East Indies.—Clocks, \$2706.—Carriage Matl., \$22.—Wheels and Axles, \$24.—Boiler Comp., \$440.—Lamp Goods, \$1085.—Plated Ware, \$161.—Hardware, \$194.—Brushes, \$111.—Freezers, \$266.

Beyrout.—Lamp Goods, \$36.

Brazil.—Bicycles, \$53.—Toilet Sets, \$45.—Hardware, \$3451.—Manufd. Iron, \$885.—Nails, \$137.—Saws, \$8.—Tinware, \$87.—Needles, \$22.—Cutlery, \$1642.—Cartridges, \$1595.—Firearms, \$1435.—Nails, \$12.—Store Trucks, \$21.—Agricult. Impts., \$15.—Machinery, \$64.—Belting, \$5.—Tricycles, \$185.—Needles, \$10.—Electrical Goods, \$20.—Plated Ware, \$1421.—Brushes, \$21.—Manufd. Wood, \$57.—Sample Goods, \$323.—Twine, \$1409.—Scales, \$37.—Iron Safes, \$465.—Woodware, \$164.—Clocks, \$48.—Coalbarrows, \$115.—Die, \$30.—Agate Ware, \$33.—Tin, \$10.—Fish Lines, \$98.—Compasses, \$99.

Brussels.—Electrical Matl., \$175.

Belfast.—Radiators, \$380.

British West Indies.—Hardware, \$1404.—Manufd. Iron, \$618.—Carriage Matl., \$809.—Agricult. Impts., \$38.—Scales, \$176.—Clocks, \$205.—Baby Cabs, \$24.—Nuts, \$78.—Nails, \$367.—Pumps, \$13.—Percussion Caps, \$30.—Sheet Zinc, \$28.—Nails, \$89.—Manufd. Copper, \$6.—Twine, \$13.—Bicycle, \$112.—Windmills, \$106.—Carriages, \$952.—Cutlery, \$7.—Iron Safe, \$21.—Brass Goods, \$7.—Refrigerators, \$47.—Freezers, \$25.—Plated Ware, \$150.—Firearms, \$442.—Carts, \$50.—Dynamite, \$225.—Machinery, \$221.—Manufd. Wood, \$179.—Lamp Goods, \$597.—Whips, \$63.—Electrical Matl., \$575.—Woodware, \$209.—Iron Hoops, \$16.—Fuse, \$398.—Bomb Lance, \$47.—Sugar Trucks, \$56.—Saws, \$23.—Tinware, \$17.—Building Matl., \$33.—Coal, \$40.—Cartridges, \$800.—Spikes, \$5.—Cider Mills, \$32.—Wheels, \$37.

Bath.—Lamp Goods, \$23.

British Guiana.—Lamp Goods, \$269.—Woodware, \$100.—Gas Fixtures, \$97.—Electrical, \$1150.—Carriage Matl., \$82.—Hardware, \$51.—Cutlery, \$15.

Cadiz.—Agricult. Impts., \$100.

China.—Hardware, \$180.

Cuba.—Hardware, \$6336.—Manufd. Wood, \$1923.—Lamp Goods, \$1247.—Wheels, \$316.—Packaging, \$56.—Cutlery, \$1209.—Nails, \$875.—Twine, \$49.—Car Trucks, \$1608.—Machinery, \$26,352.—Coal, \$1336.—Locomotives, \$14,295.—Iron Pipe, \$2943.—Agricult. Impts., \$3660.—Car Matl., \$887.—Wagons, \$500.—Pum. Stones, \$16.—Plated Ware, \$680.—Plumbing Matls., \$37.—Brushes, \$322.—Copper Tubes, \$234.—Saws, \$74.—Hand Presses, \$20.—Firearms, \$105.—Needles, \$571.—Crucibles, \$26.—Woodware, \$85.—Grindstones, \$379.—Car Matl., \$40.—Tinware, \$119.—Velocipedes, \$58.—Hose, \$151.—Thermometers, \$12.—Toilet Sets, \$22.—Manufd. Copper, \$160.—Manufd. Iron, \$10,133.—Tacks, \$51.—Electrical Matl., \$5488.—Steel, \$875.—Scales, \$708.—Pumps, \$720.—Railroad Cars, \$958.—Railroad Matl., \$809.—Iron Safes, \$300.—Valves, \$102.—India Rubber Goods, \$294.—Refrigerators, \$250.—Packing, \$53.—Carriage, \$325.—Water Closet Matl., \$506.—Hoop Iron, \$102.—Trunk Matl., \$178.—Iron, \$1141.—Copper, \$533.—Cartridges, \$119.—Shot, \$42.—Nails, \$327.—Smoke Stack, \$200.—Boiler Tubes, \$690.—Stone, \$15.—Britannia Ware, \$280.—Bird Cages, \$152.—Belting, \$12.—Bicycles, \$28.—Iron Pipe, \$520.—Locomotive Matl., \$54.—Windmills, \$52.—Wagon Matl., \$90.—Sanitary Fitting, \$175.—Baby Cabs, \$32.—Bicycles, \$71.—Mag. Metal, \$25.—Cart, \$15.

Central America.—Hardware, \$574.—Lamp Goods, \$321.—Cartridges, \$333.—Pipes, \$21.—Cutlery, \$61.—Wheelbarrows, \$29.—Manicure Supp., \$63.—Tin Plates, \$75.—Brushes, \$52.—Electrical Matl., \$1310.—Tinware, \$10.—Nails, \$8.—Twine, \$18.—Agricult. Impts., \$60.—Store Trucks, \$13.—Scales, \$105.—Woodware, \$7.—Carriage Matl., \$14.—Manufd. Iron, \$989.—Manufd. Copper, \$109.—Grindstones, \$15.—Iron Safe, \$315.—Pumps, \$275.—Machinery, \$300.—Plated Ware, \$319.—Firearms, \$251.—Tallow, \$90.—Wine, \$22.—Grindstones, \$12.—Powder, \$25.—Shot, \$48.

Dutch East Indies.—Trusses, \$35.

Dutch West Indies.—Carriages, \$660.—Pumps, \$44.—Tinware, \$62.—Manufd. Wood, \$10.—Lamp Goods, \$153.—Hardware, \$144.—Manufd. Iron, \$22.—Windmill, \$180.—Freezers, \$29.—Tacks, \$5.—Iron Pipe, \$7.—Woodware, \$56.—Coolers, \$19.—Nails, \$27.—Velocipedes, \$10.

Dublin.—Wire Mats, \$33.—Hardware, \$40.

Dundee.—Hardware, \$68.]

Danish West Indies.—Machinery, \$592.—Sugar Wagons, \$295.—Wagons, \$570.—Manufd. Iron, \$38.—Needles, \$4.—Tanks, \$250.

Dutch Guiana.—Lamp Goods, \$29.—Percussion Caps, \$11.—Assayers' Matl., \$67.—Manufd. Wood, \$3.—Hardware, \$112.—Fuse, \$18.—Blasting Matl., \$64.—Manufd. Iron, \$27.

Ecuador.—Cutlery, \$819.—Mag. Lanterns, \$262.—Hardware, \$112.—Twine, \$124.

French Possessions in Africa.—Agricult. Impts., \$946.

French West Indies.—Hardware, \$2.—Velocipedes, \$12.—Carriage Matl., \$176.

Glasgow.—Machinery, \$3091.—Lead, \$2700.—Agricult. Impts., \$1075.—Manufd. Wood, \$792.—Windmill Parts, \$230.—Oilstones, \$15.—Pumps, \$1766.—Machinery, \$700.—Hardware, \$532.—Manufd. Iron, \$58.—Waterwheel, \$410.

Hayti.—Manufd. Iron, \$131.—Lamp Goods, \$170.—Carriages, \$4043.—Tanks, \$48.—Woodware, \$37.—Machinery, \$314.—Street Lamps, \$2500.—Twine, \$35.—Tele. Matl., \$530.—Refrigerators, \$25.—Tinware, \$126.—Hardware, \$187.—Manufd. Wood, \$14.—Nails, \$111.—Brushes, \$6.—Zinc, \$20.—Carriage Matl., \$66.

Havre.—Machinery, \$690.—Agricult. Impts., \$942.—Emercy Wheels, \$282.—Lines, \$190.—Crucibles, \$55.—Hardware, \$1044.—Car Truck, \$250.

Jaffa.—Agricult. Impts., \$70.

Kief.—Agricult. Impts., \$190.

Lisbon.—Machinery, \$80.—Bags, \$240.—Manufd. Wood, \$26.

Leghorn.—Agricult. Impts., \$180.

Leeds.—Hardware, \$287.

Liege.—Scales, \$80.

London.—Firearms, \$276.—Money Drawers, \$400.—Hardware, \$2774.—Mica, \$213.—Manufd. Iron, \$2230.—Machinery, \$5640.—Agricult. Impts., \$650.—Manufd. Iron, \$85.—Ice Cream Freezers, \$114.—Belting, \$1555.—Electrical Matl., \$592.—Oil Cans, \$150.—Spelter, \$8000.—Belting, \$725.—Woodware, \$565.—Pumps, \$12.—Wringers, \$20.—Lamp Goods, \$2520.—Carriage Matl., \$195.—Windmills, \$42.

Liverpool.—Copper, \$25,000.—Woodware, \$1533.—M. Rollers, \$510.—Machinery, \$7117.—Hardware, \$5622.—Ore, \$7800.—Firearms, \$1433.—Chains, \$75.—Copper, \$12,000.—Plated Ware, \$150.—Emercy Wheels, \$250.—Tinware, \$60.—Copper Matte, \$41,000.—Iron Drums, \$214.—Pumps, \$780.—Manufd. Wood, \$679.—Manufd. Iron, \$626.—Agricult. Impts., \$722.—Electric Matl., \$150.—Screw Tops, \$900.—Fire Engines, \$175.—Lamp Goods, \$66.—Old Metal, \$854.—Razor Strops, \$119.—Cutlery, \$41.

Marseilles.—Agricult. Impts., \$355.—Coal, \$1400.—Crucibles, \$67.

Mexico.—Firearms, \$638.—Plated Ware, \$199.—Saws, \$30.—Velocipedes, \$20.—Tinfol, \$45.—Coal, \$14.—Iron Pipe, \$606.—Brushes, \$29.—Wheelbarrows, \$62.—Manufd. Iron, \$3922.—Pumps, \$108.—Electrical Matl., \$1304.—Tinware, \$189.—Saw Blades, \$93.—Nails, \$144.—Woodware, \$20.—Coal, \$19.—Carriage Matl., \$16.—Tacks, \$9.—Iron, \$120.—Cartridges, \$1270.—Cutlery, \$3299.—Agricult. Impts., \$52.—Hose, \$396.—Blowers, \$181.—Powder, \$74.—Bicycles, \$553.—Brass Goods, \$30.—Zinc Plates, \$50.—Hardware, \$3926.—Manufd. Wood, \$142.—Lamp Goods, \$1047.—Machinery, \$1489.—Belting, \$132.—Percussion Caps, \$202.—Nails, \$426.—Scales, \$553.—Plumbing Goods, \$165.—Wire Goods, \$13.—Baby Cabs, \$13.

New Zealand.—Hardware, \$70.

Nova Scotia.—Hardware, \$30.—Coal, \$655.

New Brunswick.—Coal, \$3625.

Naples.—Plated Ware, \$20.—Hardware, \$357.—Freezers, \$6.—Woodware, \$9.—Carpet Sweepers, \$10.—Tinware, \$120.

Offenbach.—Agricult. Impts., \$800.

Philippines.—Hardware, \$102.—Carriage Matl., \$536.—Grindstones, \$37.

Pern.—Hardware, \$665.—Coffin Matl., \$144.—Iron Pipe, \$33.—Cartridges, \$29.—Tinware, \$4.—Manufd. Wood, \$121.—Scales, \$61.—Lamp Goods, \$2.—Manufd. Iron, \$218.—Machinery, \$210.—Packing, \$305.—Saws, \$22.

Porto Rico.—Machinery, \$300.

Portuguese Possessions in Africa.—Machinery, \$377.

Rotterdam.—Copper, \$13,461.—Scythe Stones, \$120.—Manufd. Wood, \$179.—Hardware, \$898.—Freezers, \$43.—Plated Ware, \$78.—Scales, \$189.—Steel Wire, \$500.—Copper, \$100.—Bottle Caps, \$100.—Steel, \$904.—Tin Scraps, \$1325.—Agricult. Impts., \$1085.—Wringers, \$33.—Carpet Sweepers, \$80.—Copper, \$18,000.—Machinery, \$375.—Manufd. Iron, \$38.

Salonica.—Agricult. Impts., \$145.

St. Helens.—Tape Measures, \$1550.

San Domingo.—Manufd. Iron, \$175.—Lamp Goods, \$85.—Agricult. Impts., \$131.—Building Matl., \$155.—Brushes, \$6.—Carriages, \$300.—Machinery, \$435.—Ice Cream Freezers, \$3.—Firearms, \$300.—Tinware, \$105.—Bells, \$16.—Woodware, \$40.—Hardware, \$286.—Manufd. Wood, \$13.—Nails, \$154.—Woodware, \$29.—Cartridges, \$2000.—Vessel Supplies, \$86.—Manufd. Copper, \$5.—Scales, \$12.—Cutlery, \$144.—Velocipede, \$10.

Tunis.—Agricult. Impts., \$245.

United States of Colombia.—Hardware, \$319.—Manufd. Wood, \$37.—Twine, \$80.—Machinery, \$290.—Cartridges, \$1542.—Scales, \$7.—Lubricators, \$12.—Gaskets, \$36.—Water Closets, \$110.—Cart, \$70.—Manufd. Iron, \$3049.—Lamp Goods, \$11.—Manufd. Copper, \$129.—Electrical Matl., \$47.—Belting, \$194.—Firearms, \$225.—Packing, \$2.—Mag. Metal, \$42.—Diving Dresses, \$96.—Nails, \$90.—Cutlery, \$650.

Uruguay.—Hardware, \$393.—Twine, \$225.—Manufd. Iron, \$24.—Machinery, \$215.—Agricult. Impts., \$6993.—Manufd. Wood, \$353.—Tacks, \$37.

Venezuela.—Manufd. Iron, \$384.—Iron, \$107.—Woodware, \$7.—Machinery, \$156.—Iron Safe, \$20.—Copper Stills, \$761.—Hardware, \$49.—Manufd. Wood, \$53.—Twine, \$285.—Cutlery, \$119.—Needles, \$37.—Refrigerators, \$22.

Walsall.—Hardware, \$250.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

The sensational press, evidently taking the cue given by Stock Exchange speculators and manipulators who invariably distort facts to further their private ends when the truth will not serve, has circulated reports calculated to create the impression that the White Lead branch of the Paint trade is in a deplorable condition. That these misstatements have had a certain measure of effect upon business in the leading pigment is more than probable, since not one reader out of a hundred is acquainted with the wiles of the speculator or the avidity of the dealer in sensation to create a *furor*. While this combination of demoralizing interests may have had a certain amount of restraining influence upon business in several lines of goods, it is no secret that unfavorable weather conditions have again been somewhat of an obstacle to free movement of nearly all Paints and Colors that are largely consumed in outdoor work. As usual when outlet is narrow and orders for goods for future delivery difficult to obtain, list prices are deviated from to some extent, but no radical changes are to go on record for the week under review, and, all things considered, the general market may fairly be said to retain remarkably good form, with prospects favorable for improvement when the spring season movement gets well under way.

White Lead.—No changes in list prices have been announced by corrodors. Rumor has it that some of the outside concerns are underselling the National Company's list and that jobbers are doing likewise with some of the National Company's brands, but that the leading concerns make any concession is denied at headquarters. In fact, some outside corrodors and the jobbers enjoy the distinction of being the particular friends of the retailer and painter. It is worthy of remark in this connection, however, that the majority of the Lead sold from first hands at prices below the National Company's quotations is quick process product, the intrinsic value of which is slightly uncertain. As for business, there is nothing of real interest to report. The old-fashioned winter has doubtless effected the consumption, and that fact, along with sensational misstatements of the daily press regarding the manufacture of White Lead, seems to have checked the placing of orders for future deliveries. As matters stand, $6\frac{1}{2}\phi$, less $2\frac{1}{2}\%$ for cash, is the minimum price for National Company's brands in 12 ton lots and $7\frac{1}{4}\phi$ the rate on lots of 500 lb. One or two outside brands are being sold at $6\frac{1}{2}\phi$ for 500-lb lots, but those outside brands are of somewhat doubtful endurance and not all that could be desired for spreading capacity where first-class work is involved.

Red Lead and Litharge.—The condition of the market is unchanged. In any event all reports go to show that dealings in both foreign and domestic products are at the prices that have ruled for some time past and that business is of routine character and volume.

Orange Mineral.—For moderate quantities of both foreign and domestic there has been a fair demand. Supplies are ample, yet not burdensome, and, as a rule, the current sales are at about the line of prices that has ruled since the beginning of the year.

Zincs.—Plentiful supply and low prices of Ores are without perceptible influence upon the market for American Oxide. That is to say, manufacturers adhere to the old line of prices for the various grades. Demand runs a trifle slow at present, but the accumulation of supply, if any, appears to be well taken care of. Foreign brands are quoted as before, but,

where taken with other and more profitable goods, the Zincs are sometimes put in at special rates.

Colors, &c.—There has been nothing more than routine business in any line of Dry or Oil Colors. The same may be said regarding ready mixed Paints. Prices have undergone no change worthy of special mention.

Oils and Turpentine.

A sharp break in the market for Lard, along with some depreciation in value of inferior Greases, has led to a sharp reaction in the prices of Oils that have latterly been forced to an unusual altitude by the high cost of the hog product. The reaction, in fact, seems to have greatly disturbed speculative manipulation in the Oil line, and should there be a freer supply of hogs in the near future, which is not improbable, the events of the past week are likely to prove to have been only the beginning of the end. In any event, careful operators are keeping this possibility in the foreground and gauging their dealings accordingly. Other lubricants and soap-making materials feel the effects of the change in some degree, chiefly in the diminution of orders. In fact, there is hardly anything on the list that will not become cheaper in the event of a further considerable decline in the price of Lard. Hence caution on the part of buyers would appear to be advisable.

Linseed Oil.—Although not directly affected by the radical changes that various other lines of Oils have undergone during the past month, this article is in somewhat uncertain shape at the moment. The movement into the channels of consumption has been moderate thus far this year, owing to unfavorable weather conditions. That fact has offset, in a measure at least, the condition of the market for Seed, leaving crushers practically nothing to rely upon except ability to keep in step for mutual welfare pending a wider outlet. Harmony between the several interests is not assured, but the surface indications are that the tendency is toward consolidation of interests rather than in the opposite direction.

Cotton-Seed Oils.—Prices for the more staple lines, prime crude and Prime Summer Yellow, have dropped to the extent of 7ϕ @ 8ϕ per gallon during the week under review. Various explanations of the reaction have been volunteered and printed. Some of these looked plausible for a time, but the more studiously the situation is looked into the clearer it is seen that the break was due almost wholly to speculative demoralization caused by the sharp decline in the price of Lard and Lard compounds, in which the Oil is more or less extensively employed. Another interesting circumstance is the fact that more Oil came out for sale on the decline than the late bull operators would admit existed ten days ago. With another upward movement in Lard, the Cotton Oil market may be carried higher, but, unless there is assistance in that connection liquidation is practically assured, since considerable Oil is held, not only by speculators but by grinders who have on hand a good stock of Oil made from high-priced raw material.

Lard Oil.—With the sharp decline in price of raw material, buying interest has moderated considerably. Thus, against $\$1.07\frac{1}{2}$ @ $\$1.10$ asked for Prime City last week there are now willing sellers at $\$1.05$ for early delivery, while orders at $\$1$ for May and more distant delivery have been solicited. Stocks here are not large and Western reports are to the effect that holdings in the interior are below the average. Hence movements in prices in the immediate future depend wholly upon the course of the market for Lard, and as the latter will doubtless be regulated by the supply of hogs, the situation is speculative in the extreme.

Miscellaneous.—There has been no movement in crude Sperm Whale or Menhaden Oils and prices are uncertain for the time being. The manufactured products are moving at last week's prices, but in moderate quantities only. Cod Oils

firm but quiet. Coconut and Olive Oils have met with very fair sale at former prices.

Spirits Turpentine.—Except for moderate sized lots there has been hardly any demand. Supplies have increased until there are now about 3000 barrels in yard here. Prices have eased off to $34\frac{1}{2}\phi$ for regular and 35ϕ for machine barrels.

An Interesting Relic.

IN DISPLACING some old shelving for the purpose of carrying out alterations and improvements in the Hardware store of Buehler, Bonbright & Co., at 427 Market street, Philadelphia, a find of some interest was recently made in the shape of a small brown paper parcel, tied with twine, and bearing on its face the following inscription:

In this you will find

What is laid at May times.

If we are dead when this is found,

Give a prayer for our souls that will be profound. AMEN.

On opening the packet Mr. Bonbright found it to contain a small cardboard box such as is still used for boxing French Wire Nails, which in turn inclosed a collection of papers and small articles, which had evidently been quietly reposing undisturbed in their narrow quarters behind the old woodwork ever since the store was first occupied and fitted up by the firm almost 40 years ago. A paper dated "Philada., June 18th, 1853," was one of the contents, and showed that the packet had been deposited in its hiding place as a joke by the carpenters employed at that time in fitting the store. It runs as follows:

This emblem was written in hopes that the next one that got a hold of it would hand it down to the next person.

JOHN BOLT, Contractor for the Carpenter work now going on.

Carpenters: W. H. Wells, A. McStocker, T. Deal, J. Ryan, J. N. McCarty, C. Green, Wm. Riehl.

FURMAN BLAIR, JR., Clerk.

Attest: WM. AND CHAS. HOWELL.

June 18, 1853.

Another inclosure was a business card of the original firm of Buehler, Howard & Co., as it was then known, bearing the names of Martin Buehler, R. H. Howard, Geo. Bonbright and S. P. Suesserott; to which a melancholy interest attaches from the fact that all four have since ceased from their labors and passed away, although at that time they were mostly young men entering life. The box also contained among other relics a collection of Cut Nails of different sizes, which vary in no way from similar ones made and used at this day, as well as an old-fashioned heavy English Butt such as one never sees nowadays.

The packet is now retained as a curiosity and heirloom in the Market street store in Philadelphia, of which it has been for so long a period an unsuspected co-tenant.

The Northwestern Railroad has 27 miles of main track in Chicago, which will be elevated at a cost of $\$24,000,000$. The interest on the bonds representing this expenditure will just about equal the amount now paid for damages at grade crossings.

Myers Double and Triple Grapple Fork.

F. E. Myers & Bro., Ashland, Ohio, are putting on the market the grapple forks illustrated herewith. It is explained by the makers that the special features of this

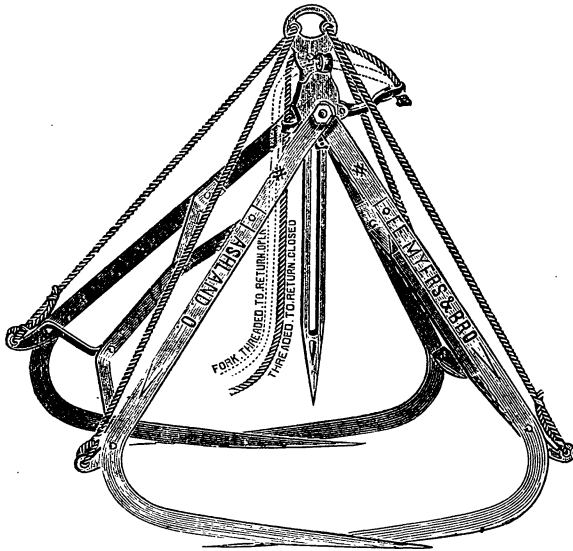


Fig. 1.—Double Grapple Fork.

style of fork are that it is a deadlock and is so arranged that when it is tripped and relieves itself of the bundle, they will fold up and return to the wagon folded, thus overcoming the objections heretofore made to grapple forks, owing to the fact that they were unwieldy to handle, dangerous to the operator on the wagon, and liable to catch on beams, &c. It is stated that the trip is sure; that it is a deadlock and

tain extent the progress made in the manufacture of work of this character. The work is of open-scroll pattern, highly ornamental. The folding gate beneath the grille has a roller to each of the two movable standards, which roll upon the floor. The gate can be opened and closed with ease, and after folding it up it can be turned to one side on its hinges and laid flat against the jamb, thus putting it

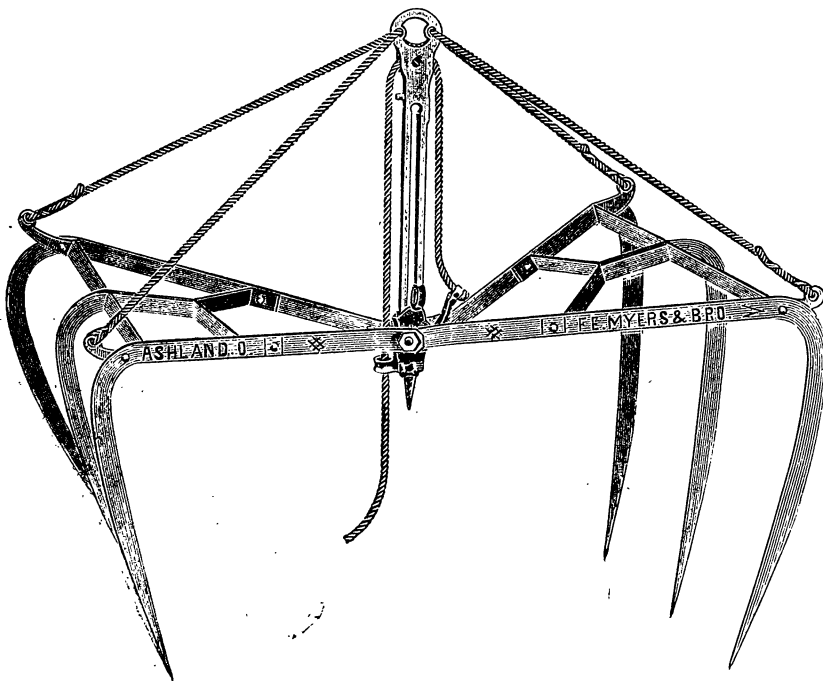


Fig. 2.—Triple Grapple Fork.

so arranged that the weight of the long trip rope will not affect it, which has been a difficulty desirable to overcome in forks of this class. The forks are built in two, four and six tines, it is claimed, of the best quality of spring steel, manufactured specially for the purpose. The tines are $2\frac{1}{2}$ inches longer than is usual in grapple forks, and, the manufacturers claim, have a large capacity, great strength, and with the self-folding device and center hand holds, are easy to handle.

Grille and Folding Gate.

Snead & Bibb Iron Works, Louisville, Ky., recently made a grille of wrought iron for a large archway, which was something handsome in the way of artistic iron work and indicates to a cer-

to the shutter and is introduced into the house to be operated, and, it is stated, without cutting the window frame so as to injure it. The point is made that the worker adjusts itself to the wind, that it cannot be broken, that it has from $3\frac{1}{2}$ to 5 inches leverage over the shutter, and has no set screws to adjust. The points of excellence of the worker are enumerated as follows: It is adapted to brick and

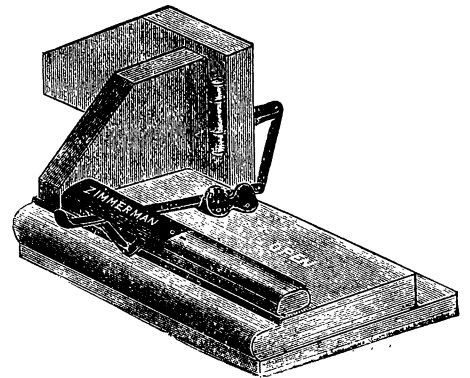


Fig. 1.—Zimmerman's Automatic Inside Shutter Worker.

frame houses where shutters are used; it adjusts itself to the shutter in any position; it is only positive opened or closed; it prevents the slamming of the shutter by the wind, or the rattling of shutters at night; the hinge or shutter cannot be broken by a sudden wind storm; the sash does not have to be hoisted to open or

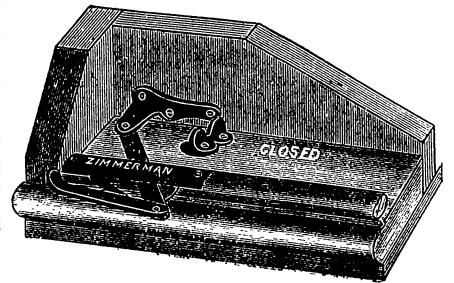
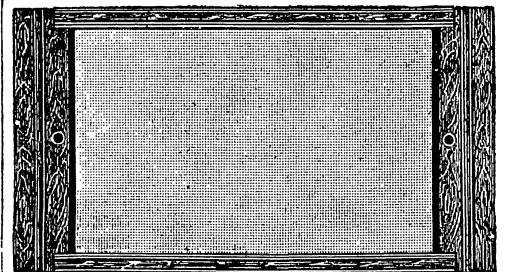


Fig. 2.—Worker with Shutter Closed.

close the shutters, thereby preventing cold draft, and mosquito bars do not have to be removed.

New Electric Window Screen.

United States Screen Company, West Randolph, Vt., are introducing the window screen herewith illustrated. The screen is of the sideboard extension type, beaded and well finished on both sides exactly alike. This, it is explained, is ac-



New Electric Window Screen.

almost entirely out of sight and out of the way.

Zimmerman's Automatic Inside Shutter Worker.

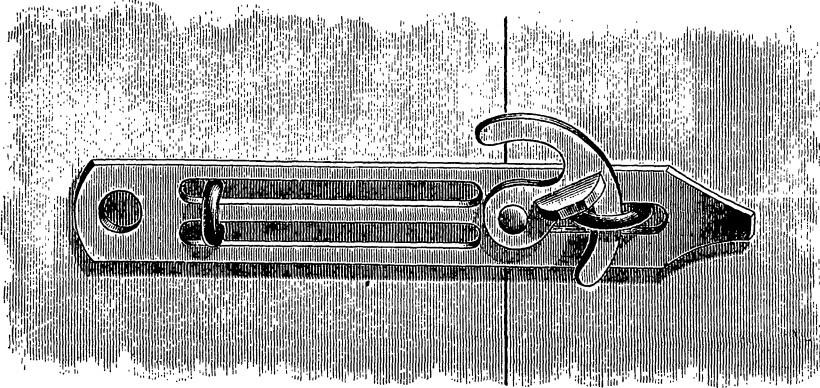
The accompanying illustrations of inside shutter worker show this device as introduced by Tyson & Zimmerman, Frederick, Md., W. H. Jacobus, 90 Chambers street, New York, agent. The worker is attached

complished by doweling both sideboards and board guides, thus doing away with guides nailed onto the back of the boards. The screen is made either with or without springs, as desired, and is stained a desirable cherry, which the manufacturers warrant not to fade.

Pugh's Adjustable Hook, Hasp and Staple.

A. F. Shapleigh Hardware Company, St. Louis, Mo., are introducing the above article, as shown herewith. The staple may be driven through the hole in the end, as in the ordinary hasp, or in the slot, as shown in the cut. Using the hasp with the staple in the slot allows

designed to hold the saw parallel with the base 8, at all times. The screw clamp, part 6, is for holding the molding while sawing, to avoid any liability of the molding shifting while the saw is in the cut. The stop, part 5, is for lengths for miter or otherwise. It is explained that the front post is adjustable to any angle and has a stop which engages in a slot, part 9, and is held by thumbscrews. The 45° right angles, and 22½° are graduated by



Pugh's Adjustable Hook, Hasp and Staple.

its adjustment to doors or gates that shrink or sag, thus giving the hasp 2 or more inches of play; while the ordinary style of hasp has less than ¼ inch play, necessitating the removal of the staple to properly adjust it to the door or gate. The hasps and hooks are right or left hand, and are made of solid steel, in regular sizes.

Henn Can Opener.

A. S. Henn & Co., New Haven, Conn., Cranston & Jennings, 80 Wabash avenue, Chicago, agents, are introducing the can opener shown herewith. It is described as all steel, made light and strong with the best of care and with a fine cutting edge. The grooved pulley working on the edge of the can allows it to be used on the top or side of can and either right or left hand. It is neat in appearance and is referred to as a fine clean cutter and sure

clamping part 17 on part 8, at both ends; angles up to 75° can also be reached. The manufacturers state that the saw guides, part 13, are made of wrought iron; the screw clamps, parts 6.6, of steel, and that all other parts are of cast iron except the rod, part 4, and the bed, both of which are made of seasoned wood well braced underneath to prevent warping. The saw is made expressly for the manufacturers, and by them is warranted in every respect. The miter box is designed for the use of carpenters, builders, cabinet and picture frame workers, show case, car builders and joiners in general. The boxes are made in eight sizes, from 3 x 18 inches to 6 x 30 inches.

The Bristol Automatic Fishing-Line Float.

The Horton Mfg. Company, Bristol, Conn., are introducing the float shown

in Fig. 2. While the float is easily adjusted to the line, it as easily detaches itself, thus saving all annoyance and inconvenience

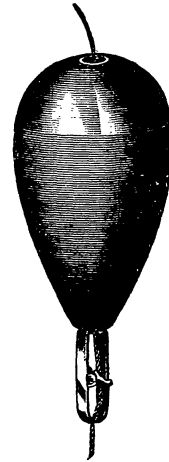


Fig. 1.—Automatic Fishing-Line Float.

and relieving the fisherman of all necessity of looking after his float while landing his fish. The automatic attachment is neat

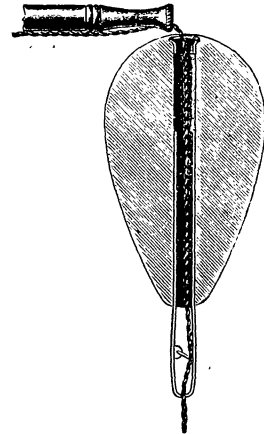


Fig. 2.—Interior Construction of Float.

in construction, being but little larger than the ordinary wood or quill center in floats.



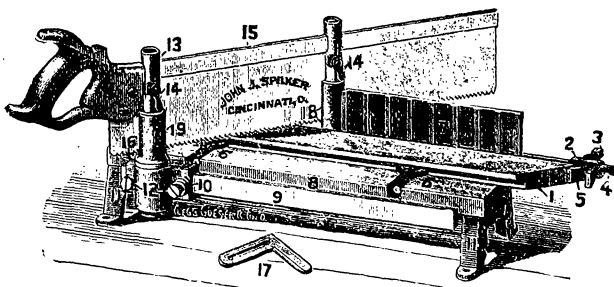
Henn Can Opener.

grip. It is made with imitation ebony handle, nickel plated; also with enameled handle, polished.

New Improved Excelsior Miter Box.

B. J. Spilker & Co., 48 and 50 Central avenue, Cincinnati, Ohio, are putting on

in Figs. 1 and 2. Through the center of the float is a hole, into which at the small end is introduced a bent piece of metal. Between the parallel sides of the metal is a small clamp so arranged to hold the fishing line between it and one side of the metal. The float is thus securely fastened at any position on the line desired. In



New Improved Excelsior Miter Box.

the market the miter box illustrated herewith. The stop gauge, part 11, for sawing tenons is set by a single thumb-screw, and the saw guides, part 13, are

reeling up the line the float is automatically released from the line by the attachment tripping as soon as the end of the rod comes in contact with the float, as shown

Sioux Chief Oil and Gasoline Can.

The can illustrated herewith is manufactured by F. C. Wilson & Co., 239-241 Lake street, Chicago, Ill., and is being



Sioux Chief Oil and Gasoline Can.

introduced by them. It is made of galvanized iron, neatly finished and ornamented, and is provided with a faucet and a tin cork lined filling screw. The stand in which the can is hung is made of No. 6 wire, japanned black. The point is made that the stand is very strong and that it may be utilized for hanging the can upon the wall, so that a child can handle it. The cans are papered and packed in quarter dozen crates.

Meat Choppers.

The Enterprise Mfg. Company, Philadelphia, Pa., have placed upon the market a new No. 3 Enterprise meat chopper, as

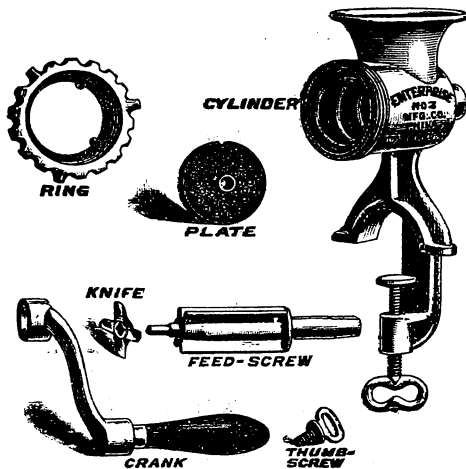


Fig. 1.—No. 3 Enterprise Meat Chopper.

shown in Fig. 1. While the outward appearance of the chopper resembles their old pattern, the principle of forcing the

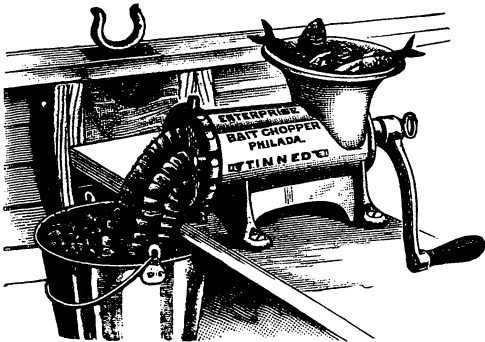


Fig. 2.—Bait Chopper.

meat to the perforated plate is practically a reversal of that formerly used. The cut shows the interior of the cylinder or

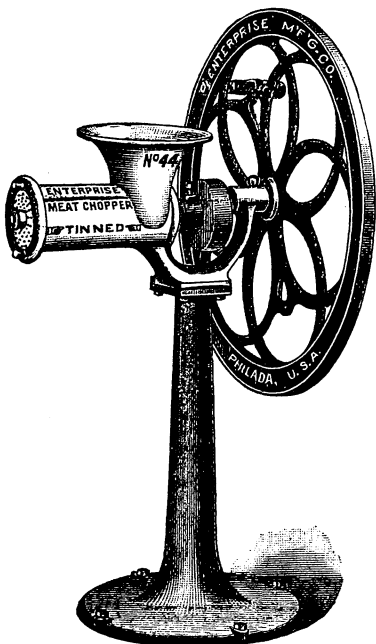


Fig. 3.—No. 44 Meat Chopper.

casing, grooved after the style used on the feed screw in the old pattern, while the feed screw used in the new pattern

has straight edges. It is claimed that the new principle in this chopper will better adapt it to household uses.

To meet a special demand, the same company have ready for the market a bait chopper, Fig. 2, which is of the same size as their No. 32 meat chopper, but is fitted with a short crank, and a plate with large holes. It is intended for use by fishermen, and is especially useful in "chumming" or "baiting" up any particular spot by spreading over the waters chopped menhaden, hardhead and other bait.

As a third novelty, the company are introducing a chopper mounted on a column, Fig. 3, and adapted to the uses of butchers and hotels. It is to be catalogued as No. 44, and is their No. 42 in a new form, provided with reversible gearing, capable of adjustment for driving the feed screw faster or slower than the crank wheel, as may be desired.

Home Tacks.

The accompanying illustrations represent the packages containing home tacks as put on the market by the Atlas Tack Cor-

rooms. The front of the cover is the same depth as the box, lithographed in colors, and presenting a pleasing appearance when the cover is closed. The 12 cartons, one of which is shown in Fig. 2, are an exact reproduction in miniature of the case, including colored lithographing, and each contains two boxes 8-ounce, one box 10-ounce, one box 12-ounce carpet tacks, one box gimp tacks and one box curtain tacks. The tacks are especially assorted for home uses, and the cartons containing the six boxes are designed to retail for 25 cents each, or single boxes of tacks may be sold for 5 cents each. The point is made that the sales of tacks can be increased, as customers may be induced to buy a carton of six boxes instead of purchasing only one box.

Collister's Trousler Guards.

Collister & Bill, 147 Ontario street, Cleveland, Ohio, are putting on the market trousler guards, one of which is shown in the accompanying illustration. The inner circle of the guard passes part way around the leg, and the guard is designed to keep

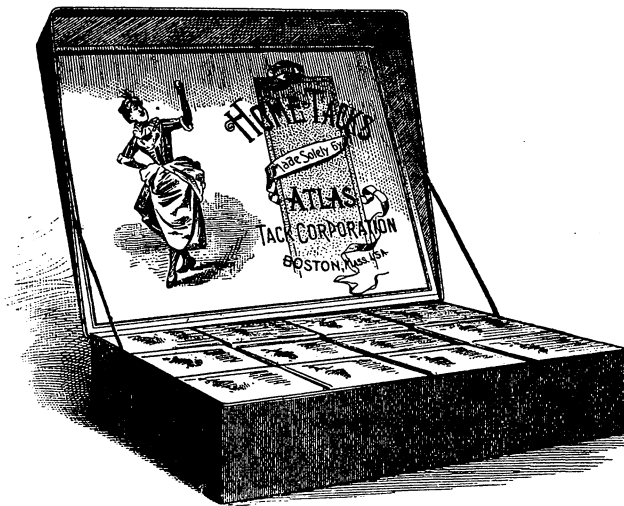


Fig. 1.—Case of Home Tacks.

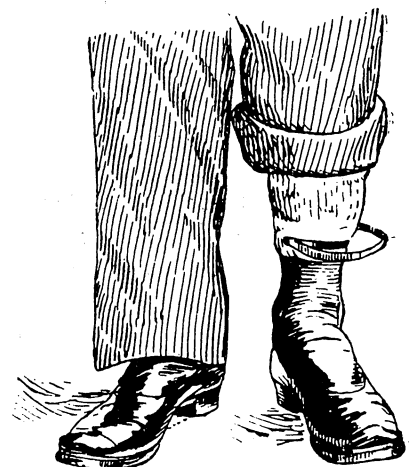
poration, Boston, Mass., and 116 Chambers street, New York. Fig. 1 shows the case containing 12 cartons of tacks, the case being about 8 x 12 inches in size and 2

the trousler leg in a natural position and at the same time draw it against the leg on the inside, as shown in the cut, on the right leg. The point is made that the



Fig. 2.—Carton Taken from the Case.

inches deep. The cover of the case is held open by tapes, and the inside and outside of the cover are handsomely lithographed in colors, making an attractive display upon counters, shelves, and in showcases, show windows and sample



Collister's Trousler Guards.

guard is entirely out of sight, does not crease the trouser and is worn without producing an untidy appearance.

Ramie fiber can be profitably cultivated in California and the Southern States. A factory for the manufacture of textile fabrics from the fiber will probably be erected at San Bernardino, Cal.

Gem Water Filter.

Edward G. Shepard, 142 Chambers street, New York agent for Jones Mfg. Company, Boston, is offering the above filter, as illustrated in the accompanying cuts. The filter, Fig. 1, is made of brass, nickel plated inside and outside, to give



Fig. 1.—Gem Water Filter.

protection from rust or corrosion. It is claimed that there are no soldered or complicated parts in their construction, and the caps at each end are held to the body by three screws, which may be removed at will. The filters are packed, it is stated, with especially prepared ground quartz, held in place by nickel-plated

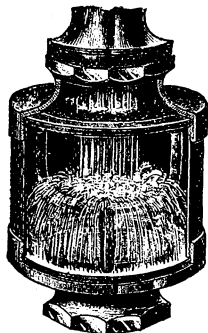


Fig. 2.—Showing Distributing Disk.

brass strainers of woven brass wire. As shown in Fig. 2, a distributing disk is suspended in the center of the filter, and is designed to divert the flow of water from a straight course, break it into a spray and throw it into all parts of the filter, thus, it is claimed, greatly increasing its filtering properties. The glass filter, Fig.

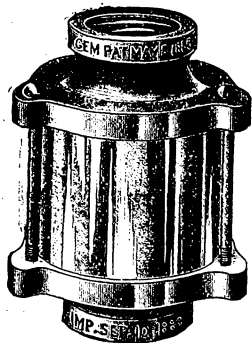


Fig. 3.—Glass Gem Filter.

3, is constructed the same as the one already described, except in its external construction, glass being used for a body instead of brass. This necessitates the use of outside screws to hold the parts together; but it is readily taken apart for refilling, and allows the working of the filter to be seen, and also the condition of the filtering material. The glass is $\frac{1}{4}$ inch thick and, being cylindrical, the makers remark that the objection of breakage is

almost entirely removed. Fig. 4 shows an attachment for plain bibbs, those having no threads, to fasten the filter to. By means of the attachment these filters may be placed upon smooth faucets of varying

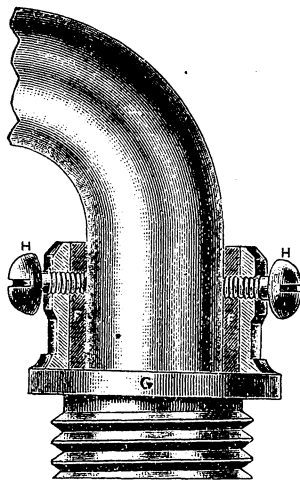


Fig. 4.—Plain Bibb Attachment.

sizes. The interior part F F is a piece of rubber tubing, held in place by the nickel-plated brass cylinder G, having the necessary filter thread, and the whole fastened to the faucet by two set screws, H H. The attachment is made in nine sizes from $\frac{7}{16}$ to $\frac{15}{16}$ in $\frac{1}{8}$ inch sizes.

Twist Drill Gauge.

We illustrate herewith a new twist drill gauge, the opposite sides being shown in Figs. 1 and 2, manufactured by T. F. Welch & Co., 65 Sudbury street, Boston, Mass. The tool is made of cast steel, hardened. The holes, it is stated, are gauged accurately, and the principal improvement embodied in this tool is that it combines a drill gauge with the tap

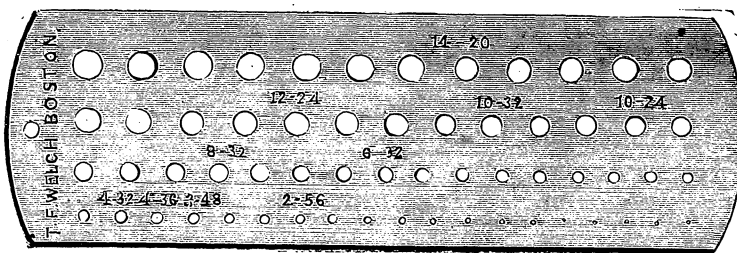


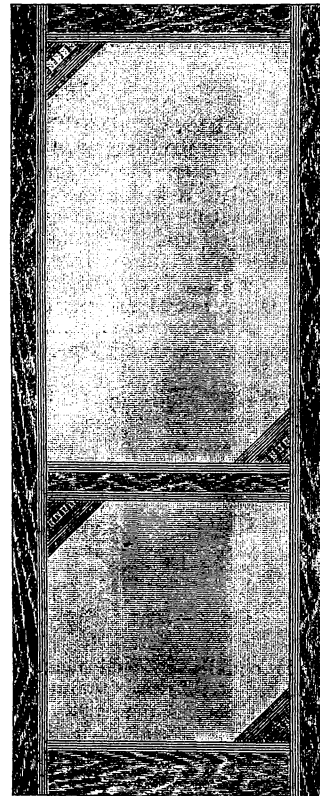
Fig. 1.—Twist Drill Gauge.

drill sizes. This is accomplished by indicating on reverse side the tap drill sizes by means of numbers. It is claimed that this is a great advantage over the old

method of guessing the sizes required by the different taps. The point is made that the tool is well made and finished and sold at a moderate price.

The Empire Fancy Screen Door.

The new pattern of screen door, as herewith illustrated, is manufactured by A. J.



The Empire Fancy Screen Door.

Phillips & Co., Fenton, Mich. It is made from selected pine, finished in natural

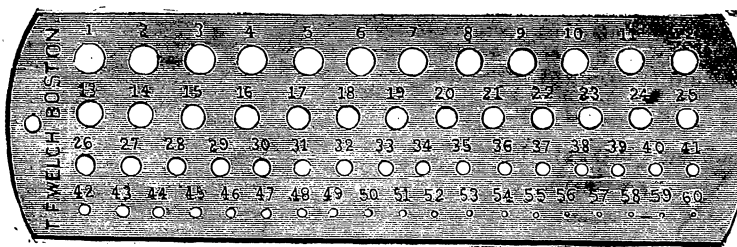


Fig. 2.—Gauge for Taps.

method of guessing the sizes required by the different taps. The point is made that the tool is well made and finished and sold at a moderate price.

Tin and Sheet Iron Job Workers' Unions, Nos. 61, 62 and 63, will soon establish a school for apprentices, at which instruc-

wood, wood filled and varnished. It is referred to as having dowel joints, stiff, strong and handsome, and as first-class in every respect. It is made in six sizes,

from 2 feet 6 inches by 6 feet 6 inches to 3 x 7 feet, $\frac{3}{4}$ and $1\frac{1}{4}$ inches thick, covered with black wire cloth, unless otherwise ordered. The manufacturers advise us that the work and material on the door are first-class, but that the design admits of rapid manufacture, and consequently the door can be sold at a low price.

Bicycle Oilers and Calls.

The Bridgeport Gun Implement Company, Bridgeport, Conn., and 813 and 315 Broadway, New York, are introducing

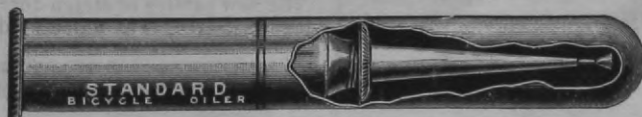


Fig. 1.—Standard Bicycle Oiler.

the bicycle sundries, as herewith shown. By pressing the protruding wire plunger, in the bicycle oiler, Fig. 1, against the object to be oiled, it will release one drop of oil, thus insuring freedom from waste, coagulation or leakage. The oiler is handsomely nickel plated, measuring 5 inches in length over all. The nickel cover over the spout is an additional safeguard for the pocket, as the oiler is especially designed for use on bicycles. The Echo call,

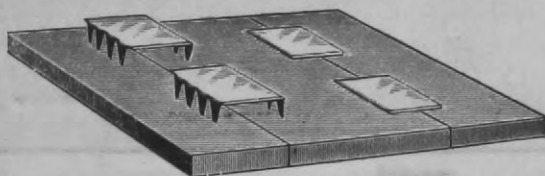


Fig. 2.—Echo Call.

Fig. 2, is equally as well made as the oilers, nickel plated, and produces a loud whistle when blown upon, with a ball inside the cylinder producing a trill. The call can be carried in the vest pocket and is especially designed for bicycle riders, huntsmen, policemen and car drivers.

Avery's Steel Belt Fasteners.

The Avery Steel Mfg. Company, Forty-third street and Stewart avenue, Chicago, Ill., are introducing fasteners, as illustrated herewith. They are made of 18 and 16 gauge steel, with teeth to drive through the belt, and clinched on the



Avery's Steel Belt Fasteners.

under side toward the break. The makers claim that the fasteners are quickly adjusted, that they cost less than lacings, and that they run smoothly on the pulleys. The point is made that old belts, thrown aside because the lacings would cut out, can be utilized, and that these fasteners save more than 50 per cent. of stoppage which would be required to mend or lace belts.

Leonard Cleanable Hardwood Refrigerators.

Grand Rapids Refrigerator Company, Grand Rapids, Mich., are putting new styles of refrigerators on the market for 1893, one style of which is shown in the accompanying cut. In the new patterns the carving is changed from the old-style spindle work to conventional designs cut in the solid wood. They have also replaced the iron hinges with false ornaments by solid bronze surface hinges made at their foundry. The interior arrangement of the refrigerator is so made, it is stated, that not a nail head shows in the zinc work,

For insulation charcoal filling is used, and as an extra safeguard against its settling down, an extra lining of heavy wool felt. The wool felt is nailed on the outside of the inside box. Their line of sideboard

tops for refrigerators is referred to as artistic, and as not only useful, but highly



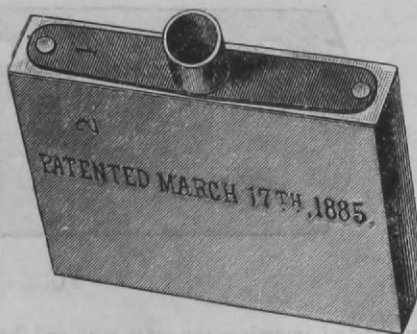
The Leonard Refrigerator.

ornamental, only the best bevel plate glass being used in these tops.

Forhan's Improved Brass Star Blind Slat Tenon.

Braunsdorf & Gerstner, 634 Eighth avenue, New York, manufacture and con-

trol the sale of the blind slat tenon, as illustrated herewith. This is made of planished brass, in one piece without seams, and is fastened in place by small



Forhan's Improved Brass Star Blind Slat Tenon.

wire brads. The tenons are applied to the end of the slat and, it is stated, cannot be seen when in place. It is claimed that in

applying the tenons there is no cutting or fitting required, a hammer being the only tool necessary to use. The projecting part is not open, as shown in the cut, but is stamped on the top with a star to prevent others, which the manufacturers consider an infringement, being sold for Forhan's patent tenons.

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Vassar Cylinder Night Latch.

The accompanying illustrations show the new Vassar cylinder night latch made by the Reading Hardware Company,

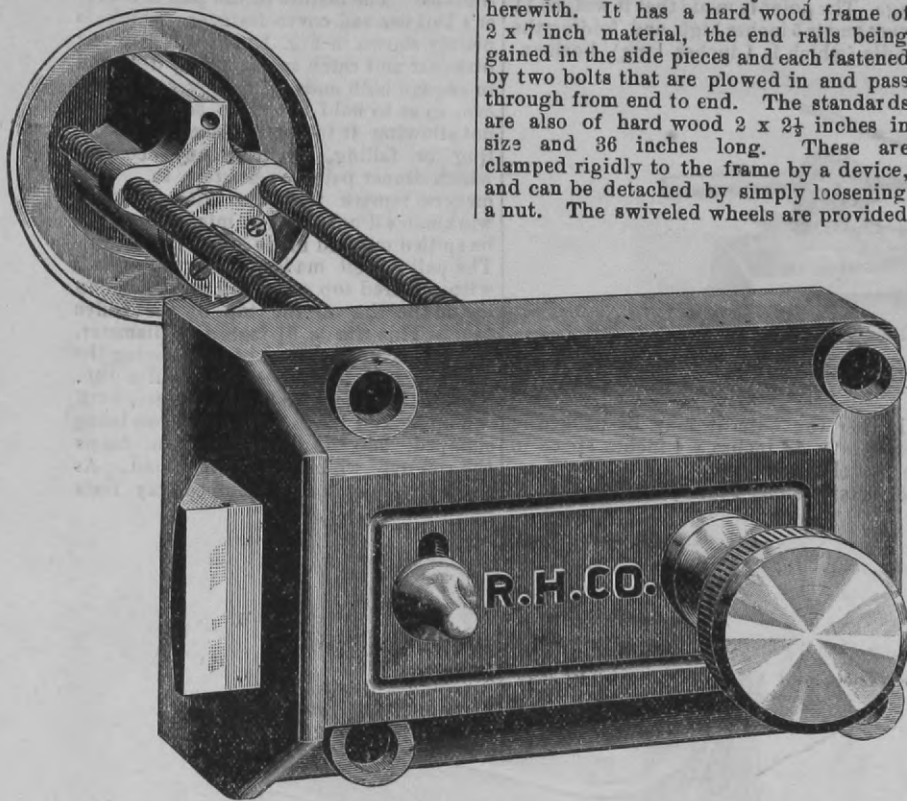


Fig. 1.—Vassar Cylinder Night Latch.

Reading, Pa., and 81 Reade street, New York. A feature in this latch is the self-adjusting connecting spindle, which readily adjusts itself to doors of any thickness, from 1 inch to $2\frac{7}{8}$ inches, without requiring filing, cutting or fitting of the spindle. The spindle is square and is permanently attached to the escutcheon. The brass knob by which the latch is operated is hollow, so that the spindle may be run into the knob the required distance. Thus the necessity of cutting off the connecting spindle or bar with accuracy is avoided and reduces the skill usually re-

quired in putting night latches of this character on doors. The self-adjusting connecting spindle is also applied to the Vassar cylinder rim dead locks made by the above company.



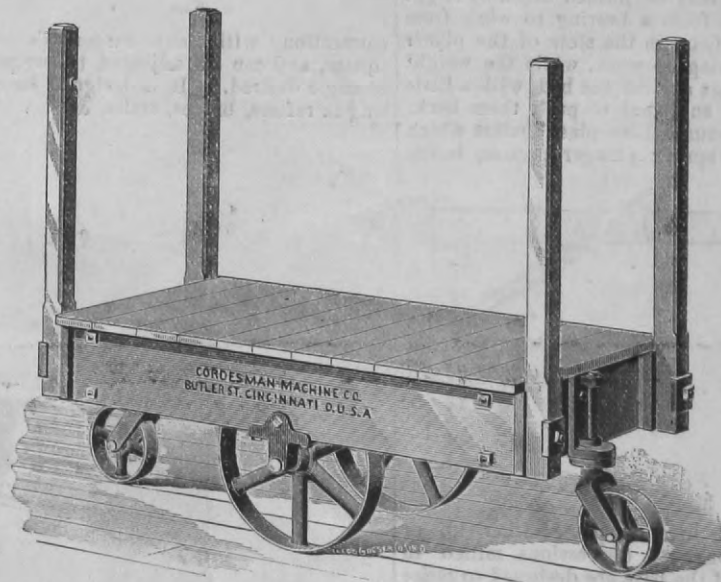
Fig. 2.—Key for Vassar Night Latch.

quired in putting night latches of this character on doors. The self-adjusting connecting spindle is also applied to the Vassar cylinder rim dead locks made by the above company.

Quite an interesting exhibit at the Columbian Exposition will be that of a Government post office in full operation. The office will be located in the Administration Building, and will be expected to handle all the mail matter of the various administrative departments of the World's Fair. The equipment of the office was, after careful consideration awarded, to the Yale & Towne Mfg. Company, and will constitute an exhibit on the part of the company of the post-office outfits, lock boxes, &c., made by them.

Factory Truck.

Cordesman Machine Company, 43-47 Butler street, Cincinnati, Ohio, are introducing a truck for factory use, as shown herewith. It has a hard wood frame of 2 x 7 inch material, the end rails being gained in the side pieces and each fastened by two bolts that are plowed in and pass through from end to end. The standards are also of hard wood 2 x $2\frac{1}{2}$ inches in size and 36 inches long. These are clamped rigidly to the frame by a device, and can be detached by simply loosening a nut. The swiveled wheels are provided

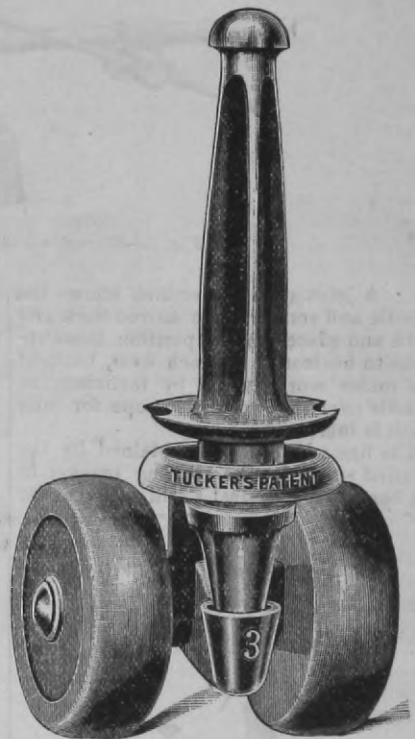


Factory Truck.

made in two sizes of platform, 24 x 48 inches and 30 x 60 inches. It is remarked that the use of such a truck systematizes the work in a factory as it is moved from one machine to another, keeping the floor neat and clean, and avoids the confusion incident to shops where material is placed and scattered over the floors.

Tucker's Improved Furniture Caster.

The caster represented in the accompanying cut shows an improved construction, introduced by the Tucker & Dorsey Mfg. Company, Indianapolis, Ind. In the improved construction all washers and screws have been done away with, and the caster consists of but two pieces of malleable



Tucker's Improved Furniture Caster.

iron, besides the wheels and axle. The loop in the housing is simply pressed around the stem, so it is stated that while there is freedom of movement and perfect oscillation, yet the stem is held securely

in place. Attention is also called to the new fluted Fox stem, which, it is claimed, makes a perfect drive stem, in addition to being expressly designed for use with the Fox socket and track plate. The point is made that the caster is extremely simple and of the most desirable design and finish.

Starrett's Gauges.

The gauges shown in the accompanying cuts are being put on the market by L. S. Starrett, Athol, Mass.

The gauge, Fig. 1, is referred to as having the following improved features,

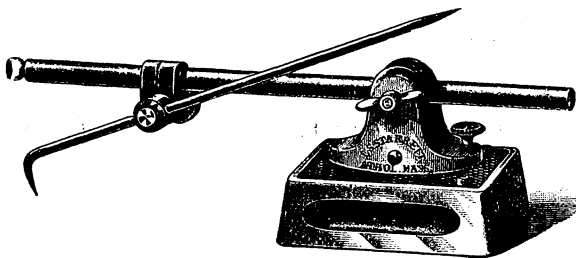


Fig. 1.—Starrett's Universal Surface Gauge.

viz.: A joint at the base which allows the spindle and scriber to be moved back and forth and placed in any position from upright to horizontal to reach over, back of and under work, while by inclining the spindle over the work its scope for long reach is increased.

The fine adjustment is obtained by the knurled screw in the rocking bracket at the base acting against a stiff spring under

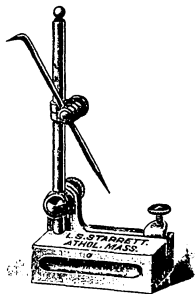


Fig. 2.—Tool-Makers' Universal Gauge.

the opposite end, while the joint above with the spindle may be set and rigidly held in any position desired. Two pins through the base, frictionally held, it is stated, may be pushed down by slight pressure to form a bearing to work from the edge of, or in the slots of the planer bed for lining up work, while the weight of the gauge against the bed with a little pressure is sufficient to push them back. Grooves around these pins, against which a pointed spring plunger presses, insure

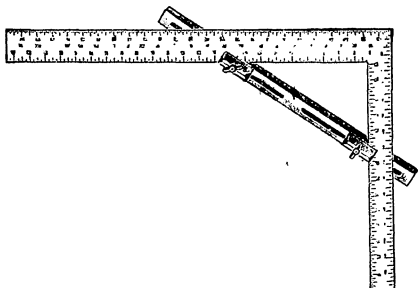


Fig. 3.—Stair Gauge.

their being held in place either up or down. Concaved depressions milled in the sides of the base are designed to make it convenient for thumb and finger to grasp.

This gauge is furnished with an improved sleeve to rigidly hold the scriber.

The gauge shown in Fig. 2 is adapted for light work and is made on the principle of the one illustrated in Fig. 1.

The base is steel, case-hardened, with depressions milled in the sides for the thumb and finger to grasp. The top side of it is slotted, and the rocking bracket is pivoted in the same. There is a stiff spring under one end of the bracket and a knurled adjusting screw in the other; the

spindle jointed to this may be set and rigidly held in any position from vertical to horizontal, and the scriber placed in position to be used below its base for depth gauge, or (with bent end down) a scribing gauge. The point is made that it weighs 11 ounces and is 5 inches high, and, folding the spindle (which is 4 inches long) horizon-

tally over the base, it may be packed in $1\frac{3}{8}$ inches x $1\frac{1}{4}$ inches x 4 inches space in the tool chest.

The stair gauge, Fig. 3, is to be used in

connection with any carpenter's steel square, and can be adjusted to any pitch or angle desired. It is designed for cutting in rafters, braces, stairs, &c.

It is made in the shape of a steel angle $\frac{7}{8}$ x $\frac{5}{8}$, $\frac{1}{4}$ inch thick, ground straight, nickel plated, and is referred to as a most valuable addition to a carpenter's kit of tools.

Acme Dinner Pail.

Acme Stamping Company, East Stroudsburg, Pa., have put on the market a dinner pail, as shown in the accompanying illustrations. The feature of the pail is Strayer's bail ear and cover fastener, which is plainly shown in Fig. 1. In it is a spring brass ear and catch in one piece, designed to engage both ends of the cover or coffee can, so as to hold the same securely and not allowing it to be displaced by upsetting or falling, or from any accident which dinner pails are subject to. The makers remark that the fastener saves workman's dinners, which might otherwise be spilled out and made unfit for eating. The pail is well made of heavy material, with a wired top edge, and with the cup inside the rim on the top of the coffee can. This rim is $3\frac{1}{4}$ inches in diameter, giving an opportunity of introducing the hand to thoroughly clean the coffee can. The can has the seam in the center, both the upper and lower parts of the can being stamped, and the projecting seam forms the rim over which the catches hold. As shown in Fig. 2, the stamped tray rests

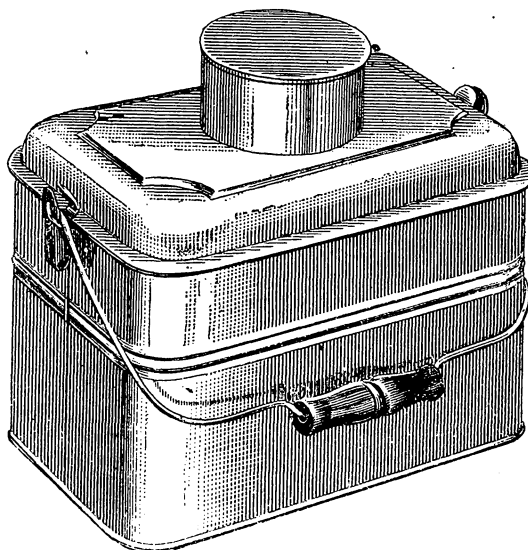


Fig. 1.—Acme Dinner Pail.

on four lugs soldered in the corners of the can just below the swage. The pails are made in three sizes, each pail separately wrapped in heavy paper and packed in

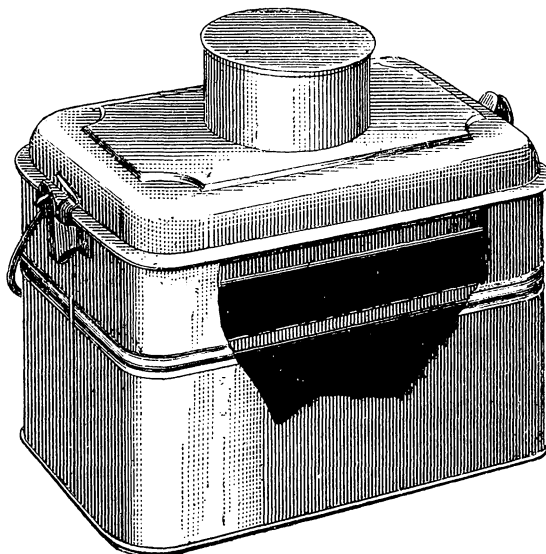


Fig. 2.—Showing Interior of Pail.

cases made especially for the purpose. The manufacturers remark that the bail ear and cover fastener is not expensive, as the pails are put on the market at a price as reasonable as other pails made similar to these.

Current Hardware Prices.

MARCH 1, 1893.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

The character @ is used to indicate a range of price; thus discount 50&10 to 50&10&5 % signifies that the goods in question are sold at prices ranging from discount 50 and 10 % to discount 50 and 10 and 5 %.

Adjusters, Blind—

Domestic..... \$ doz \$3.00, 33½¢
Excelsior..... \$ doz \$10.00, 50&10&25
North's..... list net @ 10%
Zimmerman's—See Fasteners Blind.

Ammunition—See Caps, Cartridges, &c.

Anvils—

Engle Anvils, # 0 &..... 15@15&55
Peter Wright's..... 11@11½¢
Armstrong's Mouse Hole..... 10¢@11¢
Am. Wrought, Horseshoe brand, 11@11½¢
Trenton..... 10@10½¢
Wilkinson's..... 10¢@10½¢
Moore & Barnes Mfg. Co..... 33½¢

Anvil Vise and Drill—

Millers Falls Co., \$18.00..... 20%
Cheney Anvil and Vise..... 25%
Allen Anvil and Vise, \$3.00..... 40&10
Star..... 45&55

Apple Parers—See Parers, Apple, &c.

Augers and Bits—

Douglass Mfg. Co..... }
Wm. A. Ives & Co..... }
Humphreysville Mfg. Co..... } 75%
French, Swift & Co. (F. H. Beecher)
P. S. & W. Co..... }
Rockford Bit Company..... }
Cook's, Douglass Mfg. Co..... 55%
Cook's, N. H. Copper Co..... 60%
Ives' Circular Lip..... 80%
Patent Solid Head..... 30%
C. E. Jennings & Co., No. 10, extension..... 40%
Up..... 60%
C. E. Jennings & Co., No. 30..... 60%
C. E. Jennings & Co., Auger Bits, # set, 32½ quarters, No. 5, \$5; No. 30, \$3.50, 25%
Lewis' Patent Single twist..... 45%
Russell Jennings' Augers and Bits, 25&10%
Imitation Jennings' Bits..... 60&60&10%
Fugh's Black..... 20%
Fugh's Jennings Pattern..... 30%
Car Bits, P. S. & W. Co..... 60&60&10
Snell's Car Bits..... 60%
L'Hommiedieu Car Bits..... 15&10%
Korstner Pat. Auger Bits..... 20%
Cincinnati Bell-Hangers' Bits..... 30&10

Bit Stock Drills—

Morse Twist Drills..... 50&10&55
Standard..... 50&10&55
Cleveland..... 50&10&55
Syracuse, for metal..... 50&10%
Syracuse, for wood (wood list)..... 30&10%
Cincinnati, for wood..... 30&10%
Cincinnati, for metal..... 45&10%

Expansive Bits—

Clark's small, \$18; large, \$26. 35@35&10%
Ives' No. 4, # doz. \$60..... 40%
Swan's..... 40%
Stearns, No. 1, \$28; No. 2, \$22..... 35%
Stearns' No. 2, # doz..... 20%

Gimlet Bits—

Common..... \$ gross \$2.75@3.25
Diamond..... \$ doz \$1.25..... 40&10%
Bee..... 25@25&55
Double Cut, Shephardson's..... 45@45&10%
Double Cut, Ct. Valley Mfg. Co..... 30&10%
Double Cut, Hartwell's, # gro., \$5.00..... 25%
Double Cut, Douglass..... 40&10%
Double Cut, Ives..... 60&60&10%

Hollow Augers—

Ives'..... } 33½@33½
French, Swift & Co..... }
Douglass..... } 10%
Bonney's Adjustable, # doz \$48..... 50%
Stearns'..... 20&10%
Ives' Expansive, each \$4.50..... 50&55
Universal Expansive, each \$4.50..... 50%
Wood's..... 25@25&10%
Cincinnati Adjustable..... 25&10%
Cincinnati Standard..... 25&10%

Ship Augers and Bits—

L'Hommiedieu's..... 15&10@15&10&55
Watrous..... 25@25&10%
Snell's..... 15&10@15&10&55
Snell's Ship Auger Pat'n Car Bits, 15&10@15&10&55

Awl Hafts—See Hafts, Awl.

Awls—

Awls, Sewing, Common..... \$ gr. 85¢@90¢
Awls, Should. Peg..... \$ gr. \$1.50@1.55
Awls, Pat. Peg..... \$ gr. 35¢@38¢
Awls, Shouldered Brad., \$ gr. \$1.30@1.40
Awls, Handled Brad., \$ gr. \$2.50@3.00
Awls, Handled Scratch., \$ gr. \$4.00@4.50
Awls, Socket Scratch., # doz. \$1.10@1.20

Awl and Tool Sers—See Sets, Awl and Tool.

Axes—

First quality, best brands, \$7.00..... Beveled, \$7.50
First qual., other brands..... 6.50 7.00
Second quality..... 5.50 6.00

Axle Grease—See Grease, Axle.

Axles—

No. 1..... 3¼¢@4¼¢, No. 2, 5¢@6¢
Nos. 7 to 14..... 60&10%
Nos. 15 to 18..... 47½¢
Nos. 19 to 22..... 70%
Concord Axles, loose collar..... 4¼¢@4¢
Concord Axles, solid collar..... 5¼¢@7¢
National Tubular self Oiling..... 33½¢@33½¢

Bag Holders—See Holders, Bag.

Balances—

Spring Balances..... 40%
No. 2000 20 30
Chattillon, # doz..... \$0.80 0.95 1.75 net
Chattillon Straight Balances..... 40%
Chattillon Circular Balances..... 50&10

Barb Wire—See Wire, Barb.

Bars—

Crow—
Cast Steel..... \$ doz 3¼¢
Iron, Steel Points..... \$ doz 3¢

Basins, Wash—

Standard Fiberglass, No. 1, 10½-in., \$1.80;
12-in., \$2.00; 13½-in., \$2.50; 15-in., \$3.00.

Beams, Scale—

Scale Beams, List Jan. 12, '82..... 50&10&5
Chattillon's No. 1..... 40%
Chattillon's No. 2..... 50%
Custer's..... 33½¢

Beaters—

Egg—
Dover..... \$ doz \$1.00@1.20
Duplex (Standard Co.)..... \$ doz \$1.00
Dover (Standard Co.)..... \$ doz \$1.00
Duplex Extra Heavy (Standard Co.)..... \$ doz \$3.50
Bryant's..... \$ gross \$14.00
Double (H. & R. Mfg. Co.)..... \$ gross \$12.00
\$12.00; No. 1, \$15.00; No. 2..... \$36.00
Easy (H. & R. Mfg. Co.)..... \$ gro \$12.00
Triple (H. & R. Mfg. Co.)..... \$ gro \$16.50
Spiral..... \$ gro \$4.25 @ \$4.50
Improved Acme (H. & R. Mfg. Co.)..... \$ gro \$9.00
Palme, Diehl & Co.'s..... \$ gro \$24.00
Silver & Co..... \$ doz \$5.50

Culinary—

Keystone, P. D. & Co., Each, No. 1, \$1;
No. 2, \$2..... 20%

Bells—

Cow—
Common Wrought..... 60&10%
Western, Sargent's list..... 70&10%
Kentucky, "Star"..... 20&10%
Kentucky, Sargent's list..... 70&10%
Kentucky Durham..... 70&10%
Dodge, Genuine Kentucky..... 70&10%
Texas Star..... 50&10@50&10&55

Door—

Gong, Abbe's..... 33½@10%
Gong, Yankee..... 45&10%
Gong, Barton's..... 40&10%
Crank, Brooks'..... 50&10&55
Crank, Cone's..... 10%
Crank, Connel's..... 20&10%
Lever, Sargent's..... 60&10%
Lever, Taylor's Bronzed or Plated..... net
Lever, Taylor's Japanned..... 25&10%
Lever, R. & E. Mfg. Co.'s..... 50&10&25
Full, Brook's..... 50&10&25

Electric—

Wollensak's..... 20%
Bigelow & Dowse..... 20%

Hand—

Light Brass..... 70&10@70&10&55
Extra Heavy..... 70%
White..... 70%
Silver Chime..... 33½@10%
Globe Cone's Patent..... 25&10@35%

Miscellaneous—

Call..... 45@50%
Farm Bells..... \$ doz \$3&3½¢
Steel Alloy Church and School Bells..... 40%

Bellows—

Blacksmiths'..... 60&10&5@60&10&10%
Molders'..... 40&10@50%
Hand Bellows..... 40&10@50%

Belting, Rubber—

Common Standard..... 70&10@75&55
Extra..... 70&55@70&10%
N.Y.B. & P. Co., Carbon..... 60%
N.Y.B. & P. Co., Diamond..... 50%
N.Y.B. & P. Co., Para..... 40%

Bench Stops—See Stops, Bench

Benders and Upsetters, Tire—

Stoddard's Lightning Tire Upsetters..... 15%
Detroit Perfected Tire Bender and Upsetters..... 15%
Green River Tire Benders and Upsetters..... 20%

Bits—

Auger, Gimlet, Bit Stock Drills, &c., see Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—

Cleveland Block Co., Mal. Iron, 50&50&10%
Moore's Novelty, Mal. Iron..... 50%
Sure Grip Steel Tackle Blocks..... 25%

Boils—

Carriage, Machine, &c.—

Com. list June 10, '84..... 75&10&5@80%
Genuine Eagle, Norway, list Oct. '84..... 80%
Eagle, Norway, list Oct. '84..... 80&5@80&10%
Phila. pattern, list Oct. 7, '84..... 80%
W.B.W., old list..... 70%
Machine, list Jan. 1, 1890..... 80&10%
Bolt Ends, list Jan. 1, 1890..... 80&10%

Door and Shutter—

Cast Iron Barrel, Square, &c..... 70&10%
Cast Iron Shutter Bolts..... 70&10%
Cast Iron Chain (Sargent's list)..... 65&10%
Ives' Patent Door Bolts, 60&10@60&10&55
Wrought Barrel..... 70&10@75%
Wrought Square..... 70&10@75%
Wrt Shutter, all Iron, Stanley's..... 60&10@60&10&10%
Wrt Shutter, Brass Knob..... 50&60&55%
Wrt Shutter, Sargent's list..... 80&10%
Wrt Sunk Flush, Sargent's list..... 80&10%
Wrt Sunk Stanley's list..... 80&10%
Wrt B. K. Flush, Common..... 55&10%

Stove and Plow—

Stove..... 60&10@60&10&55%
Plow..... 60&10@50&60&10&10%
R. B. & W., Plow..... 55%

Tire—

Common, list Feb. 28, '83..... 65@65&55%
Port Chester Bolt and Nut Company:
Empire list Feb. 28, '83..... 65%
Keystone, Philadel., list Oct. '84..... 80%
Norway, Phila., list Oct. '84..... 75%
American Screw Company:
Norway, Phila., list Oct. 16, '84..... 75%
Eagle, Phila., list Oct. 16, '84..... 80%
Phila., list Oct. 16, '84..... 80%
Bay State, list Feb. 28, '83..... 80%
R. B. & W., Philadel., list Oct. 16, '84..... 80%

Borers, Tap—

Common and Ring..... 20&10%
Ives' Tap Borers..... 33½@55%
Enterprise Mfg. Co..... 20%
Clark's..... 33½@35%

Borax—

Per lb..... 9¢@10½¢

Boring Machines—See Machines, Boring.

Bow Pins—See Pins, Bow.

Boxes, Wagon—

Per doz..... 23¢

Braces—

American Bit Brace and Tool Co.....
Nos. 10, 12, 20..... 60&10%
Nos. 21, 24, 27..... 70&10%
Nos. 28, 31..... 60&10&55%
Nos. 13, 26, 36, 37..... 70&10&55%
Amidon's.....
Barker's Imp'd Plain..... 75&10@80%
Barker's Imp. Nickeled..... 65&10@70%
Ratchet..... 75&10@80%
Eclipse Ratchet..... 60%
Cone Ratchet..... 40&40&10%
Corner Brace..... 40&40&10%
Universal, 8 in., \$2.10; 10 in., \$2.25
Buffalo Ball..... \$1.10@1.15
Barber's..... 50&10%
Saxton's.....
Barker's Imp. Polished..... 75&10@80%
Barker's Imp. Nickeled..... 65&10@70%
Ratchet..... 75&10@80%
Eclipse Ratchet..... 60%
Cone Ratchet..... 40&40&10%
Corner Brace..... 40&40&10%
Buffalo Ball..... \$1.10@1.15
Bartholomew's.....
Nos. 25, 27 and 30..... 50&10@60&55%
Nos. 117, 118, 119..... 70&70&55%
Common Ball, American..... \$1.00@1.10
Fray's Genuine Spindle..... 50&50&60&10%
Fray's Nos. 70 to 120, 81 to 123, 207 to 414..... 50&10%
Ives' New Haven Novelty..... 70&70&55%
New Haven Ratchet..... 60&55@60&10%
Barber Ratchet..... 60&55@60&10%
Barber's..... 60&55%
Spford..... 60&55@60&10%
P. S. & W. Co., Peck's Patent..... 60%
Rose & Johnson..... 50%
Davis Patent..... 50&10%

Brackets—

Shelf, plain..... 85@70%
Sargent's list..... 60&10@70&10%
Shelf, fancy..... 70&70&10%
Other makes at a wide range of prices.
Bradley Shelf Brackets..... 70&10%

Bright Wire Goods—See Wire.

Broilers—

Hens' Self-Inch..... 9 10 9x11
Basting. (Per doz.) \$4.50 5.50 6.50
New Haven..... 50%
Wire Goods Co..... 65&10%
Morgan Odorless..... \$ doz. \$12.50
Queen City..... 33½¢

Buckets, Well—

Galvanized—
Hill's..... \$ doz. 12 qt. \$4.25; 14 qt. \$5.25
Iron Clad..... \$ doz. 14 qt. \$4.25@4.50
Helwig's Flat Iron Band..... \$3.75
Helwig's Wired Top..... \$ doz \$4.00

Bull Rings—See Rings, Bull.

Butcher's Cleavers—See Cleavers, Butcher's.

Butts—

Brass—

Wrought Brass..... 80@80&10%
Cast Brass, Tiekout's..... 50%
Cast Brass, Fast..... 33½@10%
Cast Brass, Loose Joint..... 33½@10%

Cast Iron—

Fast Joint, Narrow..... 50&10&55@60%
Fast Joint, Broad..... 50&10@60%
Loose Joint.....
Loose Joint, Japanned.....
Loose Joint, Jap. with Acorns..... 75@75&10%
Parliament Butts.....
Mayer's Hinges.....
Loose Pin, Acorns.....
Loose Pin, Acorns, Japanned.....
Loose Pin, Acorns, Japanned, Plated Tips.....

Wrought Steel—

Fast Joint, Narrow.....
Fast Joint, Lt. Narrow.....
Fast Joint, Broad.....
Loose Joint, Broad.....
Table Butts, Back Flaps, &c.....
Inside Blind, Regular.....
Inside Blind, Light.....
Loose Pin.....
Bronzed Wrought Butts.....

Calipers—See Compasses.

Calks, Toe—

Gautier, One Prong, Blunt..... 5¢@6¢
Burke's One Prong, Blunt..... 5¢@6¢
Burke's Two Prong, Blunt..... 7¢@8¢
Burke's One Prong, Sharp..... 6¢@7¢

Can Openers—See Openers, Can.

Cans, Milk—

S. S. & Co.: 5-gal., \$2.10; 8-gal., \$3.10;
10-gal., \$3.35 each..... 25%

Caps—

Percussion—

Hicks & Goldmark's and Union Metallic Cartridge Co. \$1000
F. L. Waterproof, 1-10's..... 35¢@37¢
E. B. Trimmed Edge, 1-10's..... 47¢@50¢
E. B. Grnd. Edge, Cent. Fire, 1-10's..... 47¢@50¢

Waterproof, 1-10's..... 50¢@55¢

G. D..... 27¢@30¢

S. B. Genuine Imported..... 45¢

Eley's E. B..... 55¢@55¢

Eley's D Waterproof, Central Fire..... \$1.00

Primers—

Berdan Primers, \$1.00..... 25%
B. L. Caps (Sturtevant Shells) \$1.00..... 25%
All other Primers, \$1.20..... 25%

Cards—

Watson's Cotton, Wool, Horse and File, list January 28, 1891..... 25%

Carpet Stretchers—

See Stretchers, Carpet.

Cartridges—

Rim Fire Cartridges..... 0&5&25
Rim Fire Military..... 15&25
Cent. Fire, Pistol and Rifle..... 25&5&25
Cent. Fire, Military and Sporting..... 15&5&25
Blank Cartridges, except 22 and 32 cal., additional 10% to above discounts.
Blank Cartridges, 22 cal., \$1.75..... 25%
Blank Cartridges, 32 cal., \$3.50..... 25%
Primed Shells and Bullets..... 15&5&25
B. B. Caps, Round Ball, \$1.75..... 25%
B. B. Caps, Con. Ball, Swgd., \$2.00..... 25%
Oneida Hitter Chain..... 60&60&55%
Galvanized Pump Chain..... \$ doz \$5.40@6.40
Jack Chain, Iron..... 80&10%
Jack Chain, Brass..... 80%

Carpet Sweepers—

See Sweepers, Carpet.

Casters—

Bed..... } Brass..... 55@55&10%
Plate..... } Others..... 60@60&10%
Shallow Socket.....
Deep Socket..... 40&10%
Yale Casters, low list..... 45%
Yale, Gem..... 70%
Martin's Patent (Phoenix)..... 45&10@60&10%
Payson's Anti-friction..... 70&70&10%
Payson's Truck..... 60&60&10%
Giant Truck Casters..... 35%
Stationary Truck Casters..... 50&10%
Socket Truck Casters..... 60&60&10%
Gwinner's Common Sense..... 45%
Gwinner's Hercules..... 45%

Cattle Leaders—

See Leaders, Cattle.

Cement—

Victor Elastic..... 5 lb pails \$ doz \$5

Chain—

Trace, Wagon and Fancy Chains, List revised Oct. 15, 1892..... 60@60&10%
American Coil, in cask lots,
3-16 ¼ 5-16 ¾ 7-16 ¾ 9-16 ¾
\$7.00 5.30 4.45 3.80 3.65 3.50 3.40 3.35
Less than cask lots, add 4¢@4½¢
German Coil, list July 12, 1892..... 60&10%
German Halter Chain, list July 12, 1892..... 60&10%
Covert Halter..... 60&60%
Covert Traces..... 35&25%
Covert Heel Chain..... 50&25%

Chalk—

White, case lots..... \$ gr 50¢; small lots, 55¢
Red, case lots..... \$ gr 67¢; small lots, 72¢
Blue, case lots..... \$ gr 75¢; small lots, 80¢
See also Crayons

Chalk Lines—See Lines.**Chisels—**

Socket Framing and Firmer	
P. S. & W.	
New Haven	
Witherby	
Mix	
Ohio Tool Co.	
Douglas	75¢@75¢
Buck Bros.	60¢@100¢
Merrill	60¢@100¢
L. & I. J. White	30¢@30¢
Tanged and Miscellaneous.	
Tanged Firmers	50¢@50¢
Butcher's	\$4.75@5.00
Spears & Jackson's	\$5 to 2
Buck Bros.	30¢
Cold Chisels, P. S.	15¢@16¢

Chucks—

Beach Pat.	each, \$8.00, 20%
Morse's Adjustable, each	\$7.00, 20¢@25¢
Danbury	each, \$6.00, 30¢@25¢
Syracuse, Balz Pat.	25¢
Graham Patent	33¢@34¢
Skinner's Patent Chucks	33¢@34¢
Combination Lathe Chucks	33¢@34¢
Universal Lathe Chucks	40¢
Independent Lathe Chucks	40¢
Drill Chucks	15¢
Union Mfg. Co.	
Victor	\$8.50, 25¢
Combination	40¢
Universal	40¢
Independent	40¢

Churns—

Tinn. Union, each	5 gal. \$3.25; 7 gal., \$3.75; 10 gal. \$4.25
McDermald Star Barrel Churn, each	6 gal., \$2.60; 10 gal., \$2.75; 15 gal., \$3.00; 20 gal., \$3.25

Clamps—

R. I. Tool Co.'s Wrought Iron	25¢
Adjustable, Cincinnati	15¢@15¢
Adjustable, Hammers	15¢@15¢
Adjustable, Stearn's	30¢@30¢
Stearns' Adjustable Cabinet	30¢@30¢
ner	30¢@30¢
Cabinet, Sargent's	70¢@10¢
Carriage Makers, Sargent's	75¢@75¢
Carriage Makers, P. S. & W. Co.	40¢@10¢
Eberhard Mfg. Co.	40¢@40¢
Warner's	40¢@10¢
Saw Clamps, see Vises, Saw Filers	
Carpenter's, Cincinnati	25¢@10¢

Cleavers, Butchers'—

Bradley's	25¢@30¢
L. & I. J. White	30¢@25¢
Beatty's	25¢@40¢
New Haven Edge Tool Co.'s	40¢
P. S. & W.	35¢@35¢
Forster Bros.	30¢
Schulte, Lohoff & Co.	40¢@40¢

Clips—

Norway, Axle, 1/4 & 5-16	55¢@55¢
2d grade Norway Axle, 1/4 & 5-16	55¢@55¢
Superior Axle Clips	50¢@50¢
Norway Spring Bar Clips, 5-16	30¢@55¢
Wrought Iron Felloe Clips	5¢
Steel Felloe Clips	5¢
Baker Axle Clips	25¢

Cloth and Netting, Wire—

See Wire, &c.

Cockeyes—

Hardware list, 60¢@2¢

Cocks Brass—

Hardware list, 60¢@2¢

Coffee Mills—See Mills, Coffee.**Collars, Dog—**

Chapman Mfg. Company	50¢@100¢
Medford Fancy Goods Co.	40¢@100¢
Embossed, Gift, Pope & Steven's list	30¢@4¢
Leather, Pope & Steven's list	40¢
Brass, Pope & Steven's list	40¢

Combs, Curry—

Fitch's	50¢@100¢
Rubber, per doz.	10.00, 25¢
American Curry Comb Co.	33¢@40¢
Kohler's Magic Oscillating	doz., \$2.00
Kohler's Humane	doz., \$1.75

Compasses, Dividers, &c.—

Compasses, Callipers, Dividers	70¢@70¢
Compasses, Callipers, Dividers	70¢@70¢
Dividers	65¢
Compasses	50¢@5¢
Callipers, Wing and Inside or Outside	50¢@5¢
Callipers, Double	60¢
Callipers, Call's Patent Inside	30¢
Excelsior	50¢
J. Stevens & Co.'s	25¢@10¢
Starrett's	
Spring Callipers and Dividers	25¢@10¢
Lock Callipers and Dividers	25¢
Combination Dividers	25¢

Coolers, Water—

S. S. & Co.: 2-gal.	\$2.30; 3-gal., \$2.60;
4-gal., \$3.00; 6-gal., \$3.75 each.	33¢@3¢

Coopers' Tools—

See Tools, Coopers'.

Cord—

Sash—	
Common	doz., 9¢@10¢
Patent, good quality	doz., 11¢@12¢
White Cotton Braided, fair	doz., 24¢@25¢
Common Russia Sash	doz., 12¢@13¢
Patent Russia Sash	doz., 13¢@14¢
Cable Laid Italian Sash	doz., 20¢
India Cable Laid Sash	doz., 11¢@12¢
Silver Lake	
A quality, White, 50¢	25¢
A quality, Drab, 50¢	25¢
B quality, White, 30¢	10¢
B quality, Drab, 30¢	10¢
Sylvan Spring, Extra Braided, Drab	39¢
Semper Idem, Braided, White	27¢@28¢
Egyptian, India Hemp, Braided	26¢
Massachusetts, White	29¢
Samson	
Braided, White Cotton	doz., 37¢
Braided, Drab Cotton	doz., 42¢
Braided, Italian Hemp	doz., 40¢
Braided, Linen	doz., 56¢
Tate's Solid Braided—	
Hercules, White	doz., 25¢
Hercules, Drab	doz., 30¢
Economy White	doz., 27¢
Economy White	doz., 22¢
Ossawa Mills—	
Braided, Giant, White	doz., 30¢
Braided, Giant, Drab and Fancy	doz., 35¢

traided, Crown White, P. S., 50¢...50¢
traided, Crown Drab and Fancy, P. S., 50¢...50¢

Wire Picture—

Braided or Twisted...80¢@80¢15¢
Corkscrews—See Screws, Cork.
Corn Knives and Cutters
See Knives, Corn.

Crackers, Nut—

Table (H. & B. Mfg. Co.)	40¢
Blake's Pattern, P. S.	doz., \$2.00, 10¢
Turner & Seymour Mfg. Co.	50¢
Acme	
Japanned, P. S.	doz., \$3.00, 50¢
Nickel Plated, P. S.	doz., \$3.00, 10¢

Cradles—

Grain...50¢@5¢2¢@50¢10¢2¢

Crayons—

White Crayons, P. S.	gross, 70¢@8¢
D. M. Stewart Mfg. Co. Metal Work-	ers', P. S.
ers', gross, \$2.50	25¢
D. M. Stewart Mfg. Co., Rolling Mill	
ers', gross, \$2.50	25¢
See also Chalk.	

Creamery Pails—See Pails, Creamery.**Crow Bars—See Bars, Crow.****Curry Combs—**

See Combs, Curry.

Curtain Pins—

see Pins, Curtain.

Cutters—**Meat—**

Dixon's, P. S.	doz., 40¢@5¢
Nos.	1 2 3 4
	\$14.00 \$17.00 \$19.00 \$30.00
Woodruff's, P. S.	doz., 100 150
Nos.	1 2 3 4
	\$15.00 \$18.00

Hale's Pattern, P. S., doz., 70¢@70¢5¢

Nos. 11 12 13

American, P. S., doz., 27¢@33¢40¢

Nos. 1 2 3 4 5

Each, \$5 \$7 \$10 \$25 \$50 \$60

Enterprise, P. S., doz., 25¢

Nos. 10 12 22 32 42

Each, \$3 \$2.50 \$4 \$8 \$15

Great American Meat Cutter, P. S., doz., 30¢@30¢5¢

Nos. 112 116 118 120 122

Each, \$2.00 \$2.75 \$3.00 \$3.50 \$4.00

Miles Challenge, P. S., doz., 45¢@45¢10¢

Nos. 1 2 3

Home No. 1, P. S., doz., \$22.00 \$30.00 \$40.00

Draw Cut, each:

Nos. 5 6 7 8 9

\$50 \$75 \$80 \$225 20¢@25¢

Beef Shavers (Enterprise), P. S., doz., 20¢

Little Giant (P. S. & W. Co.), doz., 50¢

Chadborn's Smoked Beef Cutter, P. S., doz., \$60.00

Tobacco

Champion, P. S., doz., 20¢@10¢30¢

Nashua Lock Co., P. S., doz., \$13.00, 50¢@5¢

Wilson's, P. S., doz., 55¢

Sargent's, P. S., doz., \$24.00, 55¢@10¢

Acme, P. S., doz., \$20.00, 40¢

Washer—

Smith's Pat., P. S., doz., \$12.00, 20¢@10¢10¢

Penny's, P. S., doz., \$11.00, 33¢@3¢

Penny's, P. S., doz., \$11.00, 33¢@3¢

Appleton's, P. S., doz., \$16.00, 60¢@10¢

Baney's, P. S., doz., 50¢@10¢

Cincinnati, P. S., doz., 25¢@10¢

Dampers, &c.—

Dampers, Buffalo, P. S., doz., 40¢@10¢

Buffalo Damper Clips, P. S., doz., 40¢@10¢

Crown Damper, P. S., doz., 40¢

Excelsior, P. S., doz., 40¢@10¢

Diggers, Post Hole, &c.—

Samson, P. S., doz., \$34.00, 25¢@25¢10¢

Fletcher Post Hole Augers, P. S., doz., \$33.00, 20¢@20¢10¢

Vaughan's Post Hole Auger, P. S., doz., \$8.50@8.50

Kohler's Little Giant, P. S., doz., \$18.00, 40¢@10¢

Kohler's Hercules, P. S., doz., \$14.00, 40¢@10¢

Kohler's Invincible, P. S., doz., \$12.00, 40¢@10¢

Kohler's New Champion, P. S., doz., \$8.00, 40¢@10¢

Schneider, P. S., doz., \$13.00, 40¢@10¢

Cronk's Post Bars, P. S., doz., \$80.00, 50¢@50¢10¢

Gibbs' Post Hole Digger, P. S., doz., \$15.00, 40¢@10¢

Gibbs' National, P. S., doz., \$12.00, 40¢@10¢

Gibbs' Columbia, P. S., doz., \$13.00, 40¢@10¢

Gibbs' Imperial, P. S., doz., \$7.50, 40¢@10¢

Shimer's Hollow Handle, P. S., doz., \$24.00, 50¢

Dividers—See Compasses.**Dog Collars—See Collars, Dog.****Door Springs—**

See Springs, Door.

Drawers.

Money, P. S., doz., \$18¢@20¢

Drawing Knives—

See Knives, Drawing.

Drills and Drill Stocks—

Blacksmiths' Self Feeding, each \$7.50, 20¢

Breast, P. S. & W., 40¢@10¢

Breast, Wilson's, 30¢@5¢

Breast, Millers Falls, each \$3.00, 25¢

Breast, Bartholomew's, each \$2.60

Ratchet, Merrill's, 25¢@20¢5¢

Ratchet, Ingersoll's, 25¢

Ratchet, Parker's, 20¢@20¢10¢

Ratchet, Whitney's, 20¢@10¢

Ratchet, Weston's, 20¢@25¢

Ratchet, Moore's Triple Action, 25¢@30¢

Ratchet, Curtis & Drills, 30¢

Whitney's Hand Drill, Plain, \$11.00

Adjustable, \$12.00, 20¢@10¢

Wilson's Drill Stocks, 10¢

Automatic Boring Tools, \$1.75@1.85

Chicopee Automatic Drill, 20¢@10¢

Twist Drills—

Cleveland, 50¢@10¢10¢

Diamond, W. & B., 50¢@10¢10¢

Graham's Pat. Groove Shank, 60¢@10¢10¢

Morse, 50¢@10¢10¢

New Process, 50¢@10¢10¢

Standard, 50¢@10¢10¢

Syracuse (Meta list), 50¢ 10¢

Drill Bits or Bit Stock

Drills—See Augers and Bits.

Drill Chucks—See Chucks.**Dripping Pans—**

See Pans, Dripping.

Drivers, Screw—

Douglas Mfg. Co.	20¢@20¢10¢
Diston's	50¢
Buck Bros.	30¢
Stanley R. & E. Co.'s	
No. 64, Varnished Handles	65¢@10¢
No. 80	70¢@10¢
Sargent & Co.'s	
No. 1, Forged Blade	80¢@10¢10¢
Nos. 20, 40 and 60	60¢@10¢10¢
P. S. & W.	50¢@10¢5¢
Knapp & Cowles	
No. 1	60¢@20¢70¢
No. 2	60¢@10¢10¢70¢5¢
No. 3	60¢@5¢60¢10¢
Nos. 4 and 00, Acme and Ideal	50¢@5¢
Stearns'	25¢@10¢5¢
Screw Driver Bits	35¢
Champion	25¢@10¢
Clark's Pat.	30¢@33¢
Crawford's Adjustable	30¢
Goodell's Automatic	25¢@25¢10¢
Allard's Spiral, new list	25¢
Kolb's Common Sense	doz., \$8.00

Egg Beaters—See Beaters, Egg**Egg Poachers—**

See Poachers, Egg.

Electric Bell Sets—

See Bells, Electric.

Emery—No. 4 to No. 54 to Flour, CF.

46 gr. 150 gr. F.F.F.

Kegs, P. S., 4 1/2 5 5 1/2 2 1/2

1/2 kegs, P. S., 4 1/2 5 5 1/2 2 1/2

1/4 kegs, P. S., 4 1/2 5 5 1/2 2 1/2

10-cans, 10 6 6 1/2 5 5

10-cans, less

than 10, 10 10 10 7 1/2

Enameled and Tinned Ware—See Ware, Hollow.**Escutcheon Pins—**

See Pins, Escutcheon.

Escutcheons—

Door Lock, Same dis. as Door Locks.

Brass Thread, 60¢@60¢10¢

Wood, 25¢

Expanded Metal—

List No. 6.

Lathing, 10¢

Fencing, Painted Sheets, 20¢

Netting, Painted Sheets, 20¢

Door Mats, Galvanized, 25¢

Window Guards, Paneled, 15¢

Tree Guards, Paneled, 15¢

Extractors, Lemon Juice—

See Squeezers, Lemon.

Fasteners, Blind—

Mackrell's, P. S., doz., \$1.00, 20¢@20¢10¢

Van Sand's Screw Pat, \$15 gr., 60¢@10¢

Van Sand's Old Pat, \$15 gr., 55¢@10¢

Austen & Rudy No. 2008, gr., \$9.00

Halters—

Covert's, Rope, Jute.....60&10&10&2%
Covert's Rope, 7-16 in., Jute.....70&2%
Covert's Rope, 1/4 in., Hemp.....50&2%
Covert's Adj. Rope Halters.....40&2%
Covert's Hemp Horse and Cattle Ties.....50&10&2%
Covert's Jute Horse Ties.....70&2%
Covert's Jute Cattle Ties.....70&10&2%
Covert's Adj. Web Halters.....35&5&2%
Covert's Saddlery Works Halters.....33%
Covert's Saddlery Works Horse and Cattle Ties.....33%
Cattle Ties.....33%

Hammers—**Handled Hammers—**

Maydole's, list Dec. 1, '85.....25&10&35%
Buffalo Hammer Co.....50&10%
Humason & Beckley.....50&10%
Atha Tool Co.....50&10%
Verree.....40&10%
C. Hammond & Son.....40&10%
Fayette R. Plumb.....40&10%
Artisans' Choice, A. E. Nail.....40&10%
Regular Y. & P. A. E. Nail.....50%
Horseshoe Turning Hammers.....50%
Other Hammers.....50&10%
Cheney's Claw.....40&10%
Cheney's Machinist's & Riveting.....50&5%
Magnetic Tack, Nos. 1, 2, 3, \$1.25, 1.50 & 1.75.....30&10%
Nelson Tool Works.....40&10%
Warner & Nobles, new list.....25&10%
Peck, Stow & Wilcox.....35&40%
Sargent's.....40&40&10%

Heavy Hammers and Sledges—

3 lb and under.....40%
5 lb.....38%
Over 5 lb.....30%
Wilkinson's Smiths.....10%
Extra 5 to 10 lb often given.

Handcuffs and Leg Irons—

—See Police Goods.

Handles—

Cross-Cut Saw Handles—
Atkins', new list.....40%
Champion.....15%
Ely's Perfection.....\$ doz., \$3.00

Iron, Wrought or Cast—

Door or Thumb.....0 1 2 3 4
Nos.....0 1 2 3 4
Per doz.....\$0.90 1.00 1.08 1.85 1.50
Roggin's Latches.....\$ doz 30¢
Bronze Iron Drop Latches.....\$ doz 70¢ net
Jap'd Store Door Handles—Nuts, \$1.62;
Plate, \$1.10; no plate, \$0.88.....net
Barn Door, \$1.40.....10&10%
Chest and Lifting.....70&70&10%

Wood—

Saw and Plane.....40&10&50%
Hammer, Hatchet, Axe, &c.....40&40&5%
Brad Axl.....\$ gr 2.00
Hickory Firmer Chisel, ass'd.....\$ gr 4.50
Hickory Firmer Chisel, large.....\$ gr 5.00
Apple Firmer Chisel, ass'd.....\$ gr 5.00
Apple Firmer Chisel, large.....\$ gr 6.00
Socket Firmer Chisel, ass'd.....\$ gr 3.00
Socket Framing Chisel, ass'd.....\$ gr 3.00
J. B. Smith & Co.'s Pat File.....50%
File, assorted.....\$ gr 2.75
Auger, assorted.....\$ gr 5.00
Auger, large.....\$ gr 7.00
Pat. Auger, Ives'.....30&10%
Pat. Auger, Douglass.....\$ set \$1.25
Pat. Auger, Swan's.....\$ set \$1.00
Hoe, Rake, Shovel, &c.....60&60&5%

Hangers—

Barn Door, old patterns.....70&70&5%
Barn Door, New England.....70&70&5%
Samson Steel Anti-Friction.....55%
Orleans Steel.....55%
Hamilton Wrought Steel Track.....55%
Champion.....60&10%
Climax Anti-Friction.....60&10%
Fench for Wood Track.....55%
Sterling.....50&10&60%
Victor, No. 1, \$15.00; No. 2, \$16.50; No. 3, \$18.00.....50&2%
Kladder's.....50&50&10%
Boss.....60&10&60&10%
Best Anti-Friction.....60&10&60&10%
Duplex (Wood Track).....60&10&5%
Terry's Modern.....50&10&50&10%
Terry's Ideal.....50&10&50&10%
Terry's Solid.....50&10&60%
Terry's Shield.....50&10&60%
Terry's Wrought Single Strap.....50&10%
Cronk's Patent, Steel Covered.....50&10%
Carrier Steel Anti-Friction.....50&10%
Richards'.....30&30&10%
Lane's New Standard.....50&50&5%
Lane's Standard.....50&50&50&10%
Lane's Parlor.....40%
Warner's Pat.....20&10&10%
Stearns' Anti-Friction.....20&10&10%
Stearns' Challenge.....25&10&10%
Cincinnati, Nos. 1, \$2.25; 3, \$2.50; 4, \$2.50.
Paragon, Nos. 5, 6, 7 and 8.....20&10%
Crescent.....60&60&10%
Nickel Steel, Nos. 0, \$5; 1, \$20; 2, \$15.
Chicago Anti-Friction.....40&10&50%
Star.....40&10&40&10%
Barry.....50%
Interstate.....50&10&60%
Pendulum, Payson's.....40&40&10%
Moody.....45%

Harness Snaps—See Snaps.**Hatchets—**

American Axe and Tool Co.
Blood's.....40 & 10
Hunt's.....40 & 10
Hurd's.....40 & 10
Mann's.....40 & 10
Peck's.....40 & 10
Underhill's.....40 & 10
Buffalo Hammer Co.....50 & 5%
Fayette R. Plumb.....50 & 5%
C. Hammond & Son.....50 & 5%
Kelly's.....50 & 5%
Sargent's & Co.....50 & 5%
P. S. & W. Co.....50 & 5%
Ten Eyck Edge Tool Co.....10%
Collins.....50 & 5%
Schulte, Lohoff & Co.....50 & 5%
Sargent's & Co.....50 & 5%
P. S. & W. Co.....50 & 5%
Ten Eyck Edge Tool Co.....10%
Collins.....50 & 5%
Schulte, Lohoff & Co.....50 & 5%

Hay and Straw Knives—

See Knives.

Hinges—**Blind Hinges—**

Parker.....75&2%
Huffer.....60%
Clark's, Nos. 1, 3, 5, 40 and 60.....30&80&5%
Clark's Mortise Gravity.....50%
Sargent's, Nos. 1, 3, 5, 11, 12, 13, 75&10%
Reading's Gravity.....75&10%
Shepard's.....75&10%
Noiseless.....75&10%
Niagara.....80%
Buffalo.....80%
Clark's Genuine Pattern.....80%
O. S., Lull & Porter.....75&10%
Acme, Lull & Porter.....75%
Queen City Reversible.....70&10&5%
Clark's, Lull & Porter, Nos. 0, 1, 1 1/2, 2, 2 1/2, 3.....75&10&2%
North's Automatic Blind Fixtures, No. 2, for Wood, \$9.00; No. 3, for Brick, \$11.50.....10%

Gate Hinges—

Western.....\$ doz \$4.20, 60&60&10%
N. E.....\$ doz \$7.80, 60&60&10%
N. E. Reversible.....\$ doz \$5.60, 60&60&10%
Clark's, Nos. 1, 2, 3.....60&10&5%
N. Y. State.....\$ doz \$4.90, 60&60&10%
Automatic.....\$ doz \$12.50, 50%
Shepard's.....60&10&5%

Spring Hinges—

Geer's Spring and Blank Butts.....40%
Union Spring Hinge Co.'s list:
March, 1886.....20%
Barker's Double Acting.....25%
Union Mfg. Co.....25%
Bommer's.....30%
Buckman's.....15&20%
Chicago.....30%
Bardsley's Patent Checking.....15%
Acme.....30%
U. S.....25&10%
Empire and Crown.....20%
Hero and Monarch.....25%
American, Gem and Star.....20%
Oxford.....20%
Reliable.....60%
Champion.....60%
No. 10 Matchless.....60%
No. 25 Unbreakable.....60%
J. G. C. Covered, \$ gro., \$30.....50&5%
Samson.....\$ doz \$1.10, No. 2, \$1.13
Devore, No. 1.....\$ gro., \$13.00
Rex.....\$ gro., \$13.00
Freeport.....\$ gro., \$12.00
Stearns' Noiseless Floor Hinge, \$ set, \$5.00.....20&10&30%

Wrought Iron Hinges—

List February 14, 1891.
Strap and T.....50&10&50&10%
Corrugated Strap and T.....50&10&5%
Screw Hook and Eye.....\$ doz 12 in., \$ 2.30; 14 in., \$ 2.40; 16 in., \$ 2.50; 18 in., \$ 2.60; 20 in., \$ 2.70; 22 in., \$ 2.80; 24 in., \$ 2.90; 26 in., \$ 3.00; 28 in., \$ 3.10; 30 in., \$ 3.20
Strap.....(22 to 36 in. \$ 1.75; 36 in. \$ 1.80; 40 in. \$ 1.85; 44 in. \$ 1.90; 48 in. \$ 1.95; 52 in. \$ 2.00; 56 in. \$ 2.05; 60 in. \$ 2.10; 64 in. \$ 2.15; 68 in. \$ 2.20; 72 in. \$ 2.25; 76 in. \$ 2.30; 80 in. \$ 2.35; 84 in. \$ 2.40; 88 in. \$ 2.45; 92 in. \$ 2.50; 96 in. \$ 2.55; 100 in. \$ 2.60; 104 in. \$ 2.65; 108 in. \$ 2.70; 112 in. \$ 2.75; 116 in. \$ 2.80; 120 in. \$ 2.85; 124 in. \$ 2.90; 128 in. \$ 2.95; 132 in. \$ 3.00; 136 in. \$ 3.05; 140 in. \$ 3.10; 144 in. \$ 3.15; 148 in. \$ 3.20; 152 in. \$ 3.25; 156 in. \$ 3.30; 160 in. \$ 3.35; 164 in. \$ 3.40; 168 in. \$ 3.45; 172 in. \$ 3.50; 176 in. \$ 3.55; 180 in. \$ 3.60; 184 in. \$ 3.65; 188 in. \$ 3.70; 192 in. \$ 3.75; 196 in. \$ 3.80; 200 in. \$ 3.85; 204 in. \$ 3.90; 208 in. \$ 3.95; 212 in. \$ 4.00; 216 in. \$ 4.05; 220 in. \$ 4.10; 224 in. \$ 4.15; 228 in. \$ 4.20; 232 in. \$ 4.25; 236 in. \$ 4.30; 240 in. \$ 4.35; 244 in. \$ 4.40; 248 in. \$ 4.45; 252 in. \$ 4.50; 256 in. \$ 4.55; 260 in. \$ 4.60; 264 in. \$ 4.65; 268 in. \$ 4.70; 272 in. \$ 4.75; 276 in. \$ 4.80; 280 in. \$ 4.85; 284 in. \$ 4.90; 288 in. \$ 4.95; 292 in. \$ 5.00; 296 in. \$ 5.05; 300 in. \$ 5.10; 304 in. \$ 5.15; 308 in. \$ 5.20; 312 in. \$ 5.25; 316 in. \$ 5.30; 320 in. \$ 5.35; 324 in. \$ 5.40; 328 in. \$ 5.45; 332 in. \$ 5.50; 336 in. \$ 5.55; 340 in. \$ 5.60; 344 in. \$ 5.65; 348 in. \$ 5.70; 352 in. \$ 5.75; 356 in. \$ 5.80; 360 in. \$ 5.85; 364 in. \$ 5.90; 368 in. \$ 5.95; 372 in. \$ 6.00; 376 in. \$ 6.05; 380 in. \$ 6.10; 384 in. \$ 6.15; 388 in. \$ 6.20; 392 in. \$ 6.25; 396 in. \$ 6.30; 400 in. \$ 6.35; 404 in. \$ 6.40; 408 in. \$ 6.45; 412 in. \$ 6.50; 416 in. \$ 6.55; 420 in. \$ 6.60; 424 in. \$ 6.65; 428 in. \$ 6.70; 432 in. \$ 6.75; 436 in. \$ 6.80; 440 in. \$ 6.85; 444 in. \$ 6.90; 448 in. \$ 6.95; 452 in. \$ 7.00; 456 in. \$ 7.05; 460 in. \$ 7.10; 464 in. \$ 7.15; 468 in. \$ 7.20; 472 in. \$ 7.25; 476 in. \$ 7.30; 480 in. \$ 7.35; 484 in. \$ 7.40; 488 in. \$ 7.45; 492 in. \$ 7.50; 496 in. \$ 7.55; 500 in. \$ 7.60; 504 in. \$ 7.65; 508 in. \$ 7.70; 512 in. \$ 7.75; 516 in. \$ 7.80; 520 in. \$ 7.85; 524 in. \$ 7.90; 528 in. \$ 7.95; 532 in. \$ 8.00; 536 in. \$ 8.05; 540 in. \$ 8.10; 544 in. \$ 8.15; 548 in. \$ 8.20; 552 in. \$ 8.25; 556 in. \$ 8.30; 560 in. \$ 8.35; 564 in. \$ 8.40; 568 in. \$ 8.45; 572 in. \$ 8.50; 576 in. \$ 8.55; 580 in. \$ 8.60; 584 in. \$ 8.65; 588 in. \$ 8.70; 592 in. \$ 8.75; 596 in. \$ 8.80; 600 in. \$ 8.85; 604 in. \$ 8.90; 608 in. \$ 8.95; 612 in. \$ 9.00; 616 in. \$ 9.05; 620 in. \$ 9.10; 624 in. \$ 9.15; 628 in. \$ 9.20; 632 in. \$ 9.25; 636 in. \$ 9.30; 640 in. \$ 9.35; 644 in. \$ 9.40; 648 in. \$ 9.45; 652 in. \$ 9.50; 656 in. \$ 9.55; 660 in. \$ 9.60; 664 in. \$ 9.65; 668 in. \$ 9.70; 672 in. \$ 9.75; 676 in. \$ 9.80; 680 in. \$ 9.85; 684 in. \$ 9.90; 688 in. \$ 9.95; 692 in. \$ 10.00; 696 in. \$ 10.05; 700 in. \$ 10.10; 704 in. \$ 10.15; 708 in. \$ 10.20; 712 in. \$ 10.25; 716 in. \$ 10.30; 720 in. \$ 10.35; 724 in. \$ 10.40; 728 in. \$ 10.45; 732 in. \$ 10.50; 736 in. \$ 10.55; 740 in. \$ 10.60; 744 in. \$ 10.65; 748 in. \$ 10.70; 752 in. \$ 10.75; 756 in. \$ 10.80; 760 in. \$ 10.85; 764 in. \$ 10.90; 768 in. \$ 10.95; 772 in. \$ 11.00; 776 in. \$ 11.05; 780 in. \$ 11.10; 784 in. \$ 11.15; 788 in. \$ 11.20; 792 in. \$ 11.25; 796 in. \$ 11.30; 800 in. \$ 11.35; 804 in. \$ 11.40; 808 in. \$ 11.45; 812 in. \$ 11.50; 816 in. \$ 11.55; 820 in. \$ 11.60; 824 in. \$ 11.65; 828 in. \$ 11.70; 832 in. \$ 11.75; 836 in. \$ 11.80; 840 in. \$ 11.85; 844 in. \$ 11.90; 848 in. \$ 11.95; 852 in. \$ 12.00; 856 in. \$ 12.05; 860 in. \$ 12.10; 864 in. \$ 12.15; 868 in. \$ 12.20; 872 in. \$ 12.25; 876 in. \$ 12.30; 880 in. \$ 12.35; 884 in. \$ 12.40; 888 in. \$ 12.45; 892 in. \$ 12.50; 896 in. \$ 12.55; 900 in. \$ 12.60; 904 in. \$ 12.65; 908 in. \$ 12.70; 912 in. \$ 12.75; 916 in. \$ 12.80; 920 in. \$ 12.85; 924 in. \$ 12.90; 928 in. \$ 12.95; 932 in. \$ 13.00; 936 in. \$ 13.05; 940 in. \$ 13.10; 944 in. \$ 13.15; 948 in. \$ 13.20; 952 in. \$ 13.25; 956 in. \$ 13.30; 960 in. \$ 13.35; 964 in. \$ 13.40; 968 in. \$ 13.45; 972 in. \$ 13.50; 976 in. \$ 13.55; 980 in. \$ 13.60; 984 in. \$ 13.65; 988 in. \$ 13.70; 992 in. \$ 13.75; 996 in. \$ 13.80; 1000 in. \$ 13.85; 1004 in. \$ 13.90; 1008 in. \$ 13.95; 1012 in. \$ 14.00; 1016 in. \$ 14.05; 1020 in. \$ 14.10; 1024 in. \$ 14.15; 1028 in. \$ 14.20; 1032 in. \$ 14.25; 1036 in. \$ 14.30; 1040 in. \$ 14.35; 1044 in. \$ 14.40; 1048 in. \$ 14.45; 1052 in. \$ 14.50; 1056 in. \$ 14.55; 1060 in. \$ 14.60; 1064 in. \$ 14.65; 1068 in. \$ 14.70; 1072 in. \$ 14.75; 1076 in. \$ 14.80; 1080 in. \$ 14.85; 1084 in. \$ 14.90; 1088 in. \$ 14.95; 1092 in. \$ 15.00; 1096 in. \$ 15.05; 1100 in. \$ 15.10; 1104 in. \$ 15.15; 1108 in. \$ 15.20; 1112 in. \$ 15.25; 1116 in. \$ 15.30; 1120 in. \$ 15.35; 1124 in. \$ 15.40; 1128 in. \$ 15.45; 1132 in. \$ 15.50; 1136 in. \$ 15.55; 1140 in. \$ 15.60; 1144 in. \$ 15.65; 1148 in. \$ 15.70; 1152 in. \$ 15.75; 1156 in. \$ 15.80; 1160 in. \$ 15.85; 1164 in. \$ 15.90; 1168 in. \$ 15.95; 1172 in. \$ 16.00; 1176 in. \$ 16.05; 1180 in. \$ 16.10; 1184 in. \$ 16.15; 1188 in. \$ 16.20; 1192 in. \$ 16.25; 1196 in. \$ 16.30; 1200 in. \$ 16.35; 1204 in. \$ 16.40; 1208 in. \$ 16.45; 1212 in. \$ 16.50; 1216 in. \$ 16.55; 1220 in. \$ 16.60; 1224 in. \$ 16.65; 1228 in. \$ 16.70; 1232 in. \$ 16.75; 1236 in. \$ 16.80; 1240 in. \$ 16.85; 1244 in. \$ 16.90; 1248 in. \$ 16.95; 1252 in. \$ 17.00; 1256 in. \$ 17.05; 1260 in. \$ 17.10; 1264 in. \$ 17.15; 1268 in. \$ 17.20; 1272 in. \$ 17.25; 1276 in. \$ 17.30; 1280 in. \$ 17.35; 1284 in. \$ 17.40; 1288 in. \$ 17.45; 1292 in. \$ 17.50; 1296 in. \$ 17.55; 1300 in. \$ 17.60; 1304 in. \$ 17.65; 1308 in. \$ 17.70; 1312 in. \$ 17.75; 1316 in. \$ 17.80; 1320 in. \$ 17.85; 1324 in. \$ 17.90; 1328 in. \$ 17.95; 1332 in. \$ 18.00; 1336 in. \$ 18.05; 1340 in. \$ 18.10; 1344 in. \$ 18.15; 1348 in. \$ 18.20; 1352 in. \$ 18.25; 1356 in. \$ 18.30; 1360 in. \$ 18.35; 1364 in. \$ 18.40; 1368 in. \$ 18.45; 1372 in. \$ 18.50; 1376 in. \$ 18.55; 1380 in. \$ 18.60; 1384 in. \$ 18.65; 1388 in. \$ 18.70; 1392 in. \$ 18.75; 1396 in. \$ 18.80; 1400 in. \$ 18.85; 1404 in. \$ 18.90; 1408 in. \$ 18.95; 1412 in. \$ 19.00; 1416 in. \$ 19.05; 1420 in. \$ 19.10; 1424 in. \$ 19.15; 1428 in. \$ 19.20; 1432 in. \$ 19.25; 1436 in. \$ 19.30; 1440 in. \$ 19.35; 1444 in. \$ 19.40; 1448 in. \$ 19.45; 1452 in. \$ 19.50; 1456 in. \$ 19.55; 1460 in. \$ 19.60; 1464 in. \$ 19.65; 1468 in. \$ 19.70; 1472 in. \$ 19.75; 1476 in. \$ 19.80; 1480 in. \$ 19.85; 1484 in. \$ 19.90; 1488 in. \$ 19.95; 1492 in. \$ 20.00; 1496 in. \$ 20.05; 1500 in. \$ 20.10; 1504 in. \$ 20.15; 1508 in. \$ 20.20; 1512 in. \$ 20.25; 1516 in. \$ 20.30; 1520 in. \$ 20.35; 1524 in. \$ 20.40; 1528 in. \$ 20.45; 1532 in. \$ 20.50; 1536 in. \$ 20.55; 1540 in. \$ 20.60; 1544 in. \$ 20.65; 1548 in. \$ 20.70; 1552 in. \$ 20.75; 1556 in. \$ 20.80; 1560 in. \$ 20.85; 1564 in. \$ 20.90; 1568 in. \$ 20.95; 1572 in. \$ 21.00; 1576 in. \$ 21.05; 1580 in. \$ 21.10; 1584 in. \$ 21.15; 1588 in. \$ 21.20; 1592 in. \$ 21.25; 1596 in. \$ 21.30; 1600 in. \$ 21.35; 1604 in. \$ 21.40; 1608 in. \$ 21.45; 1612 in. \$ 21.50; 1616 in. \$ 21.55; 1620 in. \$ 21.60; 1624 in. \$ 21.65; 1628 in. \$ 21.70; 1632 in. \$ 21.75; 1636 in. \$ 21.80; 1640 in. \$ 21.85; 1644 in. \$ 21.90; 1648 in. \$ 21.95; 1652 in. \$ 22.00; 1656 in. \$ 22.05; 1660 in. \$ 22.10; 1664 in. \$ 22.15; 1668 in. \$ 22.20; 1672 in. \$ 22.25; 1676 in. \$ 22.30; 1680 in. \$ 22.35; 1684 in. \$ 22.40; 1688 in. \$ 22.45; 1692 in. \$ 22.50; 1696 in. \$ 22.55; 1700 in. \$ 22.60; 1704 in. \$ 22.65; 1708 in. \$ 22.70; 1712 in. \$ 22.75; 1716 in. \$ 22.80; 1720 in. \$ 22.85; 1724 in. \$ 22.90; 1728 in. \$ 22.95; 1732 in. \$ 23.00; 1736 in. \$ 23.05; 1740 in. \$ 23.10; 1744 in. \$ 23.15; 1748 in. \$ 23.20; 1752 in. \$ 23.25; 1756 in. \$ 23.30; 1760 in. \$ 23.35; 1764 in. \$ 23.40; 1768 in. \$ 23.45; 1772 in. \$ 23.50; 1776 in. \$ 23.55; 1780 in. \$ 23.60; 1784 in. \$ 23.65; 1788 in. \$ 23.70; 1792 in. \$ 23.75; 1796 in. \$ 23.80; 1800 in. \$ 23.85; 1804 in. \$ 23.90; 1808 in. \$ 23.95; 1812 in. \$ 24.00; 1816 in. \$ 24.05; 1820 in. \$ 24.10; 1824 in. \$ 24.15; 1828 in. \$ 24.20; 1832 in. \$ 24.25; 1836 in. \$ 24.30; 1840 in. \$ 24.35; 1844 in. \$ 24.40; 1848 in. \$ 24.45; 1852 in. \$ 24.50; 1856 in. \$ 24.55; 1860 in. \$ 24.60; 1864 in. \$ 24.65; 1868 in. \$ 24.70; 1872 in. \$ 24.75; 1876 in. \$ 24.80; 1880 in. \$ 24.85; 1884 in. \$ 24.90; 1888 in. \$ 24.95; 1892 in. \$ 25.00; 1896 in. \$ 25.05; 1900 in. \$ 25.10; 1904 in. \$ 25.15; 1908 in. \$ 25.20; 1912 in. \$ 25.25; 1916 in. \$ 25.30; 1920 in. \$ 25.35; 1924 in. \$ 25.40; 1928 in. \$ 25.45; 1932 in. \$ 25.50; 1936 in. \$ 25.55; 1940 in. \$ 25.60; 1944 in. \$ 25.65; 1948 in. \$ 25.70; 1952 in. \$ 25.75; 1956 in. \$ 25.80; 1960 in. \$ 25.85; 1964 in. \$ 25.90; 1968 in. \$ 25.95; 1972 in. \$ 26.00; 1976 in. \$ 26.05; 1980 in. \$ 26.10; 1984 in. \$ 26.15; 1988 in. \$ 26.20; 1992 in. \$ 26.25; 1996 in. \$ 26.30; 2000 in. \$ 26.35; 2004 in. \$ 26.40; 2008 in. \$ 26.45; 2012 in. \$ 26.50; 2016 in. \$ 26.55; 2020 in. \$ 26.60; 2024 in. \$ 26.65; 2028 in. \$ 26.70; 2032 in. \$ 26.75; 2036 in. \$ 26.80; 2040 in. \$ 26.85; 2044 in. \$ 26.90; 2048 in. \$ 26.95; 2052 in. \$ 27.00; 2056 in. \$ 27.05; 2060 in. \$ 27.10; 2064 in. \$ 27.15; 2068 in. \$ 27.20; 2072 in. \$ 27.25; 2076 in. \$ 27.30; 2080 in. \$ 27.35; 2084 in. \$ 27.40; 2088 in. \$ 27.45; 2092 in. \$ 27.50; 2096 in. \$ 27.55; 2100 in. \$ 27.60; 2104 in. \$ 27.65; 2108 in. \$ 27.70; 2112 in. \$ 27.75; 2116 in. \$ 27.80; 2120 in. \$ 27.85; 2124 in. \$ 27.90; 2128 in. \$ 27.95; 2132 in. \$ 28.00; 2136 in. \$ 28.05; 2140 in. \$ 28.10; 2144 in. \$ 28.15; 2148 in. \$ 28.20; 2152 in. \$ 28.25; 2156 in. \$ 28.30; 2160 in. \$ 28.35; 2164 in. \$ 28.40; 2168 in. \$ 28.45; 2172 in. \$ 28.50; 2176 in. \$ 28.55; 2180 in. \$ 28.60; 2184 in. \$ 28.65; 2188 in. \$ 28.70; 2192 in. \$ 28.75; 2196 in. \$ 28.80; 2200 in. \$ 28.85; 2204 in. \$ 28.90; 2208 in. \$ 28.95; 2212 in. \$ 29.00; 2216 in. \$ 29.05; 2220 in. \$ 29.10; 2224 in. \$ 29.15; 2228 in. \$ 29.20; 2232 in. \$ 29.25; 2236 in. \$ 29.30; 2240 in. \$ 29.35; 2244 in. \$ 29.

Presses—

Fruit and Jelly—
Enterprise Mfg. Co. 25¢
Henis. doz \$3.50
Shepard's Queen City 40¢
Silver & Co. doz \$2.75

Pruning Hooks and Shears—See Shears.**Pullers Nail—**

Scranton. doz., \$18.00, 33¢
Curtis Hammer. doz., \$9.00
Giant, No. 1. doz., \$18.00, 10¢
Giant, No. 2. doz., \$15.00, 10¢
Pelican. doz., \$9.00, 25¢
Eclipse. Each, \$2.00, net
Economy. doz., \$6.00

Pulleys—

Hot House, Awning, &c. 60¢@70¢
Japanned Screw. 60¢@10¢
Brass Screw. 70¢
Japanned Side. 60¢@10¢
Japanned Clothes Line. 60¢@10¢
Moore's Sash, Anti-Friction. 50¢
Hay Fork, Solid Eye, 4 in. Swivel. \$4.50
Hay Fork, "Anti-Friction," 5 in. solid. \$5.70
Hay Fork, "F" Common and Patent Bushed. 20¢
Hay Fork, Trough Pat. Iron. 20¢
Hay Fork, Reed's Self-Lubricating. 60¢
Shade Rack. 45¢
Tackle Blocks—See Blocks.
Moore's Anti-Friction 5 in. Wheel. doz., \$12.00, 40¢
Shepard's Niagara, No. 25. 80¢
Sash (Auger Mortise). 60¢
Common Sense. 60¢
Empire. 60¢
Ideal, Nos. 2, 4, 10 & 15. 60¢ less 1¢
Acme. doz net.
Star.
On bbl. lots extra 5¢.
Ideal, Nos. 25 and 55. doz. 22¢ net.

Pumps—

Cistern, Best Makers. 60¢@10¢
Pitcher Spout, Best Makers. 87¢@70¢
Pitcher Spout, Cheaper G'ds. 75¢@75¢

Punches—

Saddler's, drive, good. doz., 80¢@85¢
Bemis & Call Co.'s Cast Steel Drive. 50¢@55¢
Bemis & Call Co.'s Springfield Socket. 50¢@55¢
Spring, good quality. doz., \$2.50, \$2.60
Spring, Leach's Pat. 15¢
Bemis & Call Co.'s Spring and Check. 40¢
Solid Tinnings, P. S. & W. Co. \$1.44
Tinnings' Hollow Punches, P. S. & W. Co. 20¢@25¢
Rice Hand Punches. 15¢
Avery's Revolving. 40¢
Avery's Sawset and Punch—See Sawsets

Rail—

Sliding Door, Wrt Brass. 35¢, 40¢
Sliding Door, Bronzed Wrt Iron. ft., 7¢
Sliding Door, Iron, Painted. ft., 4¢, 40¢
Barn Door, Light. in. 1/2 3/4 3/4
Per 100 feet. \$2.00 2.50 3.10, 10¢
B. D. for N. E. Hangers.
Per 100 feet. \$3.15 2.70 3.25 Net
Terry's Steel Rail. ft., 4¢
Victor Track Rail, 7¢. 50¢@25¢
Carrier, double braced, Steel Rail, ft. 34¢@4¢
Moore's Wrought Iron. 25¢
Moody Steel Rail ft., 6¢. 45¢

Rakes—

Cast Steel, Association & ds. 70¢@70¢&25¢
Cast Steel, outside g'ds. 70¢@70¢&25¢
Malleable. 70¢@70¢&25¢
Gibbs' Lawn Rake. doz., \$3.75
Gibbs' Canton Lawn Rake. doz., \$3.75
Gibbs' Acme Lawn Rake. doz., \$4.75
Gibbs' Favorite Lawn Rake. doz., \$3.90
Gibbs' Crown Lawn Rake, No. 1. doz., \$4.90
Oneida Lawn Rake. doz., \$4.90
Fort Madison Prize Bow Brace and Peerless. 65¢
Fort Madison Steel Tooth Lawn Rake. \$6.00, 25¢

Razors—

J. R. Torrey Razor Co. 20¢
Wostenholme and Butcher, \$10 to £. 10¢
Jordan's A.A.I., new list. Net
Jordan's Old Faithful, new list. Net
Galvanic. doz., \$15.00
Electric Cutlery Co. 50¢
Campbell Cutlery Co. 50¢

Razor Straps—**Rings and Ringers—**

Bull Rings—
Union Nut Co. 55¢
Sargent's. 75¢@10¢
Hotchkiss' low list. 30¢
Humason, Beckley & Co.'s. 70¢@10¢
Peck, Stow & W. Co.'s. 50¢@10¢
Elrich Haw. Co., White Metal, low list. 50¢@10¢

Hog—

Top of the Hill Ringers. doz \$2.00
Top of the Hill Ringers. doz \$1.25
Hill's Improved Ringers. doz \$1.25
Hill's Old Style Ringers. doz \$1.25
Hill's Tongs. doz \$3.00
Hill's Rings. doz bxs \$1.00
Perfect Ringers. doz bxs \$1.50
Perfect Ringers. doz \$2.15 @ \$2.25
Blair's Hog Ringers. doz \$2.00
Blair's Hog Ringers. doz \$2.00
Champion Ringers. doz \$2.00
Champion Ringers, Double. doz \$2.25
Brown's Ringers. doz \$2.00
Brown's Ringers. doz \$1.15 @ \$1.25
Electric Hog Ringers. doz boxes \$1.50
Electric Hog Ringers. doz \$2.00
Major Ringers. doz \$1.25
Major Ringers. doz \$2.00

Rivets and Burrs—

Iron, list Nov. 17, '87. 60¢@10¢
Copper. 60¢@10¢
Coppered Iron, Bettina Brand. 40¢

Rivet Sets—See Sets.**Roasting and Baking Pans—See Pans, Roasting and Baking.****Rods—**

Star, Brass. 25¢@30¢
Star, Black Walnut. doz 40¢

Rollers—

Iron Door, Sargent's list. 60¢@10¢
Acme Moore's Anti-Friction. 55¢
Union Barn Door Roller. 70¢
Thompson Mfg. Co.'s Lawn Roller. 20¢

Rope—The following prices are for b. New York or factory, and are shaded 1/4¢@1/2¢ on large lots; terms, 1 1/4% for cash.
Manilla, 7-16 in. diam. and larger. 9 3/4¢
Manilla. 7 1/2 in. 10 1/4¢
Manilla, Tarred Rope. 9 1/4¢
Manilla, Hay Rope. 9 1/4¢
Sisal. 7-16 inch and larger. 7 1/2¢
Sisal. 3/4 in. 8 1/2¢
Sisal. 1/2 and 5-16 in. 8 1/2¢
Sisal, Hay Rope. 7 1/2¢
Sisal, Tarred Rope. 7 1/2¢
Sisal, Medium Lath Yarn. 7 1/2¢
New Zealand. 7-16 in. & larger. 6 1/4¢
New Zealand. 3/4 inch. 7 1/4¢
New Zealand. 1/2 and 5-16 inch. 7 1/4¢
New Zealand, Hay Rope. 6 1/4¢
New Zealand, Tarred Rope. 6 1/4¢
Cotton Rope. 13¢@11¢
Jute Rope. 6 1/4¢@7¢

Wire—

List February, 1892. All kinds. 45¢

Rules—

Boxwood. 80¢@10¢
Ivory. 50¢@10¢
Starrett's Steel Rules and Straight Edges. 25¢@10¢

Sad Irons—See Irons, Sad.**Sand and Emery Paper and Cloth—**

See Paper and Cloth.

Sash Cord—See Cord, Sash.**Sash Locks—See Locks, Sash.****Sash Weights—**

See Weights, Sash.

Sausage Stuffers or Fillers—See Stuffers or Fillers, Sausage.**Saws—**The following prices are generally cut by jobbers.

Disston's Circular. 45¢@45¢
Disston's Cross Cut. 40¢@40¢
Disston's Hand. 25¢
Woodrough & McParlin.
Hand, Panel and Rip. 30¢@30¢
Narrow Champion Cross Cuts with Handles. 18¢@20¢
Champion Thin Back Cross Cuts. 20¢@28¢
Champion Extra Thin Back Cross Cuts. 20¢@31¢
One Man Champion Cross Cuts. 37¢@40¢
Wheeler, Madden & Clemson Mfg. Co.
Hand, Panel and Rip. 35¢@35¢
Narrow Champion Cross Cuts with Handles. 18¢@20¢
Champion Thin Back Cross Cuts. 26¢@28¢
Champion Extra Thin Back Cross Cuts. 29¢@31¢
One Man Champion Cross Cuts. 37¢@39¢
Atkins' Circular. 30¢
Atkins' Cross Cuts, new list. 30¢
Atkins' Mulay, Mill and Drag. 40¢
Atkins' One-Man Saw. 40¢
Peace Circular and Mill. 45¢@45¢
Peace Hand Panel and Rip. 25¢@25¢
Peace Cross Cuts. 45¢@45¢
Richardson's Circular and Mill. 45¢@45¢
Richardson's X Cuts. 45¢@45¢
Richardson's Hand, &c. 25¢@25¢
C. E. Jennings & Co.'s brand. 25¢

Hack Saws—

Griffin's, complete. 40¢@10¢
Griffin's Hack Saw Blades. 40¢@10¢
Star Hack Saws and Blades. 25¢
Eureka and Crescent. 25¢

Scroll—

Lester, complete, \$10.00. 25¢
Rogers, complete, \$4.00. 25¢
Barnes' Builders' and Cab Makers' \$15.25. 35¢
Barnes' Scroll Saw Blades. 35¢

Saw Frames—

See Frames, Saw.

Saw Sets—See Sets, Saw.**Saw Tools—See Tools, Saw.****Scales—**

Hatch, Counter, No. 171, good quality. doz \$18.00 @ \$19.00
Hatch, Tea, No. 161. doz \$6.50 @ \$7.00
Union Platform, Plain. \$2.10 @ \$2.20
Union Platform, Striped. \$2.40 @ \$2.50
Chattillon's Grocers' Trip Scales. 50¢
Chattillon's Eureka. 25¢
Chattillon's Favorite. 40¢
Family, Turnbills. 30¢@30¢
Riehle Bros.' Platform. 40¢

Scale Beams—

See Beams, Scale.

Scissors, Fluting. 45¢**Scrapers—**

Adjustable Box Scraper (S. R. & L. Co.) \$6.00. 30¢@10¢
Box, 1 Handle. doz \$2.25 @ \$2.50
Box, 2 Handle. doz \$3.00 @ \$3.25
Defiance Box and Ship. 20¢@10¢
Foot. 50¢@10¢
Ship, Common. doz \$3.50 net
Ship, R. I. Tool Co. 10¢

Screen Window and Door Frames—See Frames**Screw Drivers—**

See Drivers, Screw.

Screws—**Bench and Hand—**

Bench, Iron. 55¢@10¢
Bench, Wood, Beech. doz \$2.25
Bench, Wood, Hickory. 20¢@10¢
Hand, Wood. 25¢@10¢
Hand, Grand Rapids, list. 35¢

Coach, Lag and Hand-Rail—

Lag, Blunt Point, list Jan. 1, 1890. 80¢@10¢
Coach and Lag, Gimlet Point, list Jan. 1, 1890. 80¢@10¢
Hand Rail, Sargent's. 70¢@10¢
Hand Rail, H. & B. Mfg. Co. 70¢@10¢
Hand Rail, Am. Screw Co. 75¢

Jack Screws—

Jack Screws, Millers Falls list. 50¢@10¢
Jack Screws, P. S. & W. 35¢
Jack Screws, Sargent. 70¢
Jack Screws, Stearns'. 40¢@10¢

Cork—

Humason & Beckley Mfg. Co. 40¢@10¢
Williamson's. 33¢@10¢
Detroit Cork Screw Co. 33¢

Machine—

Flat Head Iron. 65¢
Round Head Iron. 60¢

Wood—

List January 1, 1891.
Flat Head Iron. 70¢
Flat Head Iron. 65¢ Extra 10
Flat Head Brass. 70¢ 10¢
Round Head Brass. 65¢ 10¢
Flat Head Bronze. 70¢ 10¢
Round Head, Bronze. 65¢
Rogers' Drive Screws. 82¢

Scroll Saws—See Saws, Scroll.**Scythes—**

Grain. 40¢@5¢
Grass. 40¢@10¢

Scythe Snaths—

See Snaths, Scythe.

Sets—

Awl and Tool—
Alken's Sets, Awls and Tools, No. 20. 60¢@60¢
Fray's Adj. Tool Hdl's, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100. 45¢
Miller's Falls Adj. Tool Hdl's, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100. 25¢
Henry's Combination Haft. doz \$6.50
Stanley's Excelsior. No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50
Common Brad Sets, No. 42, \$10.50; No. 43, \$12.50. 70¢@10¢

Nail—

Square. gr. \$1.00 @ \$1.25
Round. gr. \$1.35 @ \$1.50
Hammer, Hotchkiss. \$5.50, 10¢
Cannon's Diamond Point. gr. \$12.50

Rivet—

Regular list. 70¢

Saw—

Stillman's Genuine. doz \$5.00 @ 7.75, 40¢@5¢
Stillman's Pattern, Hand, doz \$3.25, 40¢@5¢
Cross Cut, \$5.25. 55¢
Common Lever. doz \$2.00, 45¢@20¢
Morrill's No. 1. \$15.00, 40¢@10¢
Nos. 3 and 4, \$18.00. 40¢@5¢
No. 5, \$24.00. 40¢@5¢
Leach's. No. 0, \$8.00; No. 1, \$15.15 @ 20¢
Nash's. 20¢@10¢
Hammer, Hotchkiss. \$5.50, 10¢
Hammer, Bemis & Call Co.'s new Pat. 30¢@5¢
Bemis & Call Co.'s Lever and Spring Hammer. 30¢@5¢
Bemis & Call Co.'s Plate. 10¢
Bemis & Call Co.'s Cross Cut. 12¢
Alken's Genuine. \$13.00, 50¢@10¢
Alken's Imitation. \$7.00, 55¢@5¢
Bart's Pat. Lever. 20¢
Disston's Star. 25¢
Leopold. 40¢@10¢
Atkin's Lever. doz No. 1, \$6.00
Atkin's Criterion. doz No. 1, \$6.00
Crisant (Keller), No. 1, \$15.00. 40¢@10¢
Avery's Saw Set and Punch. 50¢
Kohler's Royal. doz \$7.00
Kohler's Giant Royal. doz \$12.00
Crescent. doz \$3.00
Lloyd's Acme. doz \$15, 40¢@10¢
Taintor Positive. doz \$18, 50¢

Sharpeners, Knife—

Larkins'.
Applewood Handles. doz. \$6.00, 40¢
Rosewood or Cocobola. doz. \$9.00, 40¢

Shaves, Spoke—

Iron. 45¢
Wood. 30¢
Bailey's (Stanley R. & L. Co.). 40¢@10¢
Stearns'. 30¢@10¢
Cincinnati. 25¢@10¢
Goodell's doz. \$9.00. 25¢

Shears—

American (Cast) Iron. 75¢@10¢
Bernard's Lamp Trimmers. doz. \$3.75
Seymour's, List Dec. 1881. 60¢@10¢
Heimisch's, List Dec. 1881. 60¢@10¢
Heimisch's Tailor's Shears. 33¢@5¢
Cast Steel Trimmers:
First quality. 80¢@80¢
Second quality. 80¢@10¢
Acme Cast Shears. 10¢@10¢
Diamond Cast Shears. 10¢
Clapper. 10¢@10¢
Victor Cast Shears. 75¢@10¢
Howe Bros. & Hulbert, Solid Forged Steel. 40¢
Hatch Cutlery Co., Solid Steel Forged. 80¢
Davenport Cutlery Co. 60¢@10¢
Clausen Shear Co., Japanned. 70¢
Clausen Shear Co., Nickel, same list. 60¢
Galvanic 3/4 to 1 in. doz. \$1.00 net
Electric Cutlery Co. 75¢
Campbell Cutlery Co., Jap'd. 75¢
Nickel Plated. 65¢

Pruning Shears and Hooks—

Diston's Combined Pruning Hook and Saw. doz. \$18.00, 20¢@10¢
Diston's Pruning Hook. doz. \$12.00, 20¢@10¢
E. S. Lee & Co.'s Pruning Tools. 50¢@10¢
Pruning Shears, Henry's Pat. doz. \$3.75 @ \$4.00
Henry's Pruning Shears. doz. \$4.25 @ \$4.50
Wheeler, M. & C. Co., Combination. doz. \$12.00, 20¢
Dunlap's Saw and Chisel. doz. \$8.50, 30¢
J. Mallinson & Co., No. 1, \$5.25; No. 2, \$7.25. 60¢
P. S. & W. Co. 60¢

Tinners', &c.—

Shears and Snips (P. S. & W.). 20¢@25¢
Snips, J. Mallinson & Co. 33¢@35¢

Sheaves—**Sliding Door—**

M. W. Co., list July, 1888. 50¢@10¢
R. & E., list Dec. 18, 1885. 55¢@20¢
Corbin's list. 60¢@10¢
Patent Roller. 60¢@10¢
Patent Roller, Hatfield's. 75¢
Russell's Anti-Friction, list Dec. 18, 1885. 60¢
Moore's Anti-Friction. 50¢

Sliding Shutter—

R. & E., list Dec. 18, 1885. 60¢@10¢
Sargent's list. 70¢
Reading list. 60¢@10¢

Shells—

First quality 4, 8, 10 and 12 gauge. 25¢@10¢
First quality Rival, Club and Climax brands, 14, 16 and 20 gauge (\$7.50 list). 20¢@10¢
Star, Club, Rival and Climax Brands. 33¢@10¢
Smokeless brand, 12, 10, 16 gauge. 33¢@10¢
Trap brand, 12 and 10 gauge. 33¢@10¢
Seibold's Comb. Shot Shells. 15¢@25¢
Brass Shot Shells, 1st quality. 60¢@25¢
Brass Shot Shells, Club, Rival, Climax. 65¢@30¢

Shells, Loaded—

Standard List, July 19, 1890. 40¢@10¢
L. & I. J. White. 20¢@5¢

Ship Tools—

Burden's, Perkins', Phoenix, Standard, Diamond State and Bryden's Boss, at factory. \$4.00
Bryden's Frog Pressure, at factory. \$5.00

Shoes, Horse, Mule, &c.—**Horse—**

Burden's, Perkins', Phoenix, Standard, Diamond State and Bryden's Boss, at factory. \$4.00
Bryden's Frog Pressure, at factory. \$5.00

Mule—

Add \$1 per keg to above prices.

Ox Wrought—

Ton lots. 1000 lb lots. 500 lb lots.

Shot—

Drop, up to B. 25-m bag. \$1.45
Drop, up to B. 5-m bag. 35¢
Drop, B and larger, 25-m bag. 1.70
Drop, B and larger, 5-m bag. 40¢
Buck and Chilled, 25-m bag. 1.70
Buck and Chilled, 5-m bag. 40¢
Dust Shot, 25-m bag. 2.00
Dust Shot, 5-m bag. 45¢

Shovels and Spades—

Ames' Shovels, Spades, &c., list Nov. 1, 1885. 20¢
Note.—Jobbers frequently give 50¢@75¢ extra on above.
Griffith's Black Iron. 50¢@10¢
Griffith's C. S. 60¢@10¢
Griffith's Solid C. S. R. R. Goods. 20¢
St. Louis Shovel Co. 20¢@10¢
Hussey, Blans & Co. 15¢@25¢
Hubbard & Co. 20¢@10¢
Lehigh Mfg. Co. 50¢@10¢
H. M. Myers Co. 80¢
Payne Pettebone & Son. 33¢@5¢
Remington's (Lowman's Pat.) 40¢@10¢
Rowland's Black Iron. 50¢@10¢
Rowland's Steel. 60¢@10¢
Terra Haute Shovel & Tool Co. 25¢

Shovels and Tongs—

Iron Head. 60¢@10¢
Brass Head. 60¢@10¢

Sieves—

Mann's Tin Rim. 50¢@25¢
Buffalo Metallic, S. S. &

Snaps, Harness, &c.

Anchor (T. & S. Mfg. Co.)	.....65¢
Fitch's (Bristol)	.....50¢10¢
Hotchkiss	.....10¢
Andrews	.....50¢
Sargent's Patent Guarded	.....70¢10¢10¢
German, new list	.....40¢10¢
Covert	.....50¢10¢5¢2¢
Covert, New Patent	.....50¢10¢5¢2¢
Covert, New R. E.	.....60¢10¢5¢2¢
Covered Spring	.....60¢10¢10¢
Covert's Saddlery Works' Triumph33¢4¢
John Protz Snaps75¢75¢5¢

Snaths. Scythe—

List50¢50¢5¢
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Soldering Irons—See *Irons, Soldering.***Spittoons, Cuspidors, &c.**

Standard Fiberware—

Cuspidors, 8½-inch, # doz., No. 5, #8; No. 52, #9.	
Spittoons, Daisy, 8-inch, No. 1, 4; 10 and 11 inch, #8.	

Spoke Shaves—See *Shaves, Spoke.***Spoke Trimmers—**See *Trimmers, Spoke.***Spoons and Forks—**

Tinned Iron—

Basting, Cen. Stamp. Co.'s list	.....70¢10¢
Solid Table and Tea, Cen. Stamp. Co.'s list	.....70¢10¢
Buffalo, S. S. & Co.	.....35¢4¢2¢

Silver Plated—

months or 5¢ cash 30 days:	
Meriden Brit. Co., Rogers	.....40¢15¢
C. Rogers & Bros.	.....40¢15¢
Rogers & Bros.	.....40¢15¢
Reed & Barton	.....40¢15¢
Wm. Rogers Mfg. Co.	.....40, 15¢5¢
Simpson, Hall, Miller & Co.	.....40, 15¢5¢
Holmes & Edwards Silver Co.	.....40, 15¢5¢
L. Boardman & Son	.....50¢12¢4¢

Miscellaneous—

Holmes & Edwards Silver Co.	
No. 67 Mexican Silver	.....50¢10¢5¢
No. 30 Silver Metal	.....50¢10¢5¢
No. 24 German Silver	.....50¢10¢5¢
No. 60 Nickel Silver	.....60¢5¢
No. 49 Nickel Silver	.....50¢10¢5¢
Wm. Rogers Mfg. Co.	
Rogers' Silver Metal	.....50¢10¢5¢
18¢ Rogers' German Silver	.....60¢5¢
22¢ Rogers' Nickel Silver	.....50¢5¢
German Silver	.....50¢5¢10¢
German Silver, Hall & Elton	.....50¢5¢ cash
Nickel Silver	.....50¢5¢10¢5¢ cash
Britannia	.....60¢5¢10¢
Boardman's Nickel Silver, list July 1, 1891	.....60¢5¢10¢
Boardman's Britannia Spoons, cash lots	.....60¢5¢ cash

Springs—

Door—

Torrey's Rod, 39 in	.....# doz \$1.20@1.2
Warner's No. 1, # doz \$1.80; No. 2, #3.40	.....# doz \$1.80; No. 2, #3.40
Gem (Coll), list April 19, 1886	.....50¢55¢10¢
Star (Coll), list April 19, 1886	.....20¢10¢
Victor (Coll)	.....60¢10¢@60¢10¢5¢
Champion (Coll)	.....60¢10¢@60¢10¢5¢
Gowalla's No. 1, # doz \$1.80; No. 2, #16.00	.....# doz \$1.80; No. 2, #16.00
Rubber, complete, # doz \$4.50	.....# doz \$4.50
Hercules	.....50¢50¢10¢

Carriage, Wagon, &c.

Allyprie, Concord, Platform and Half Scroll	.....net prices
Oliver's Bolster Springs	.....25¢

Squares—

Steel and Iron	.....85¢@85¢5¢
Nickel-Plated	.....85¢@85¢5¢
Try Square and T Bevels	.....60¢10¢10¢
Diston's Try Square and T Bevels	.....50¢
Winterbottom's Try and Miter	.....30¢10¢
Starrett's Micrometer Caliper Squares	.....25¢
Avery's Flush Bevel Squares	.....40¢
Avery's Bevel Protractor	.....60¢

Squeezers—

Fodder—

Blair's "Climax"	.....# doz \$2.00
Blair's "Climax"	.....# doz \$1.25

Lemon—

Porcelain Lined, No. 1	.....# doz \$6.00
Wood, No. 2	.....# doz \$3.00, 35¢
Wood, Common	.....# doz \$1.70@1.75
Dunlap's Improved	.....# doz \$3.75, 20¢
Bamms, No. 1, \$5.00; No. 2, \$9; 12	.....# doz \$5.00; No. 2, \$9; 12
Jennings' Star	.....# doz \$2.50
The Boss	.....# doz \$2.50
Dean's, Nos. 1, # doz \$5.50; 2, #3.35; 3, \$1.90; Queen, \$2.50	.....# doz \$5.50; 2, #3.35; 3, \$1.90; Queen, \$2.50
Little Giant	.....60¢@50¢5¢
King	.....40¢5¢
Hotchkiss Straight Flash	.....# doz \$12.00
Silver & Co., Glass	.....# gro \$9.00
Manny Lemon Juice Extractor	.....# doz \$0.75@1.00
Standard	.....# doz \$2.00
Improved	.....# doz \$2.00

Standard Fiber Ware—See *Ware, Standard Fiber.***Staples—**

Barbed 3/16 in. and larger	.....# 7@7½¢
Barbed 1/4 in.	.....# 8@8½¢
Fence Staples, Galvanized	.....# as B'n'W
Fence Staples Plain	.....# as B'n'W
Grand Crossing Tack Co.'s list	.....# 7@10¢
Steelyards	.....40¢10¢50¢
Stocks and Dies—	
Blacksmith's	.....35¢
Waterford Goods	.....35¢
Butterfield's Goods	.....35¢
Lightning Screw Plate	.....25¢30¢
Beece's New Screw Plates	.....25¢30¢
Reversible Ratchet	.....30¢
Gardner	.....25¢
Gwynn River	.....25¢30¢
Stops, Bench—	
Morrill's	.....# doz \$9, 50¢
Hotchkiss's	.....# doz \$5, 10¢@10¢10¢
Weston's, No. 1, #10; No. 2, #9, 25¢10¢5¢	.....# doz \$5, 10¢@10¢10¢

McGill's, # doz \$3.

Cincinnati	.....25¢10¢
Terrell's Nos. 1 and 2, # doz, #3; No. 3, #3.60	.....# doz, #3; No. 3, #3.60

Stone—Stones, Grind—See *Grindstones.***Scythe Stones—**

Pike Mfg. Co., list April, 1892	.....33¢4¢
Cleveland Stone Co., list Nov. 1892	.....33¢4¢

Oil Stones, &c.

Pike Mfg. Co.	
Hindustan No. 1, # d	.....8¢
Sand Stone	.....40¢40¢
Turkey Oil Stone, # to 8	.....10¢
In	.....80¢
Turkey Slips	.....\$2.00
Washita Stone, Extra	.....50¢
Washita Stone, No. 1	.....40¢
Washita Stone, No. 2	.....30¢
Washita Slips, Extra	.....80¢
Washita Slips, No. 1	.....70¢
Arkansas Stone, No. 1, 8 to 5½	.....in \$2.80
Arkansas Stone, No. 1 5½ to 8 in.	.....\$3.50
Lake Superior	.....# d 13¢
Lake Superior Slips	.....# d 20¢

Stove Polish—See *Polish, Stove.***Staplers Carpet—**

Cast Steel, Polished	.....# doz \$2.2
Cast Iron, Steel Points	.....# doz \$2.00
Socket	.....# doz \$1.75
Bullard's	.....25¢25¢10¢

Strops, Razor—

Genuine Emerson	.....60¢@60¢5¢
Imitation	.....# doz \$2.00, 20¢10¢5¢
Torrey's	.....20¢
Badger's Belt and Com.	.....# doz \$2.00
Montom Combination	.....# doz \$4.00
Jordan's Pat. Padded, list Nov. 1, '89, 50¢	.....# doz \$4.00
Electric Cutlery Co.	.....Net
Campbell Cutlery Co.	.....Net

Stuffer, Sausage—

Miles' Challenge, # doz \$20	.....50¢50¢5¢
Perry	.....# doz, No. 1, \$15.00; No. 0, \$21.00
Drew Cut No. 6, each \$30.00	.....50¢5¢50¢10¢
Enterprise Mfg. Co., list Jan 17, '93	.....20¢
Silvers	.....40¢10¢

Sweepers, Carpet and Lawn—**Carpet—**

Bissell No. 5	.....# doz \$17.00
Bissell No. 8	.....# doz \$20.00
Bissell, Grand	.....# doz \$36.00
Standard	.....# doz \$24.00
Domestic	.....# doz \$21.00
Domestic, No. 2	.....# doz \$22.00
Garland Rapids	.....# doz \$24.00
Crown Jewel, No. 1, \$18.00; No. 2, \$19.00; No. 3, \$20.00	.....# doz \$18.00; No. 2, \$19.00; No. 3, \$20.00
Magic	.....# doz \$15.00
Improved Parlor Queen	.....# doz \$27.00
Nickel	.....# doz \$24.00
Jannaped	.....# doz \$22.00
Excelsior	.....# doz \$22.00
Garland	.....# doz \$18.00
Parlor Queen	.....# doz \$24.00
Housewife's Delight	.....# doz \$15.00
Queen	.....# doz \$16.00
Queen, with band	.....# doz \$18.00
Weed, Improved	.....# doz \$18.00
Hub	.....# doz \$16.00
Cog-Wheel	.....# doz \$16.00
Ladies' Friend	.....# doz \$15.00
Ladies' Friend No. 2	.....# doz \$16.00
Advance	.....# doz \$16.00
Durander	.....# doz \$10.00
Triumph	.....# doz \$20.00
Goshen	.....# doz \$21.00
Supreme	.....# doz \$22.00
Easy	.....# doz \$22.00
Gilt Edge	.....# doz \$24.00
America	.....# doz \$20.00
Imperial	.....# doz \$26.00
Grand Republic	.....# doz \$30.00
Banner	.....# doz \$22.00
The Star	.....# doz \$21.00
Reliable	.....# doz \$22.00
The Rapid	.....# doz \$22.00
Our Own	.....# doz \$27.00
Model	.....# doz \$27.00
Goshen Sweeper Company, Grand Rapids, Mich., make the following rebates:	
5 dozen in 6 months	.....# doz \$1.00
10 dozen in 6 months	.....# doz \$2.00
20 dozen in 6 months	.....# doz \$3.00
Exception on L.F., when 10 dozen price is \$13.50, and 25 dozen \$13.00.	

Lawn—

Thompson Mfg. Co.30¢
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Swings—

Davies Lawn

25¢

Tacks, Brads &c.—

List October 19, 1889. Old established straight weights. Short Weight goods are sold at lower prices.

Carpet Tacks—

American, Blued	.....60¢5¢
American, Tin'd and Cop'd	.....70¢
Steel, Bright and Blued	.....60¢5¢
Steel, Tinned and Coppered	.....70¢
Swedes Iron, Blued	.....72½¢
Swedes Iron, Tinned	.....75¢
American Iron Tacks, Domestic	.....60¢5¢
Swedes Iron Tacks—	
S. S., Blued	.....60¢5¢
S. S., Tinned	.....70¢
Lanc., Blued	.....55¢
Lanc., Tinned	.....60¢
Gimp and Lace Tacks	.....62½¢
S. S., Blued	.....62½¢
S. S., Tinned	.....60¢5¢
Lanc., Blued	.....55¢
Lanc., Tinned	.....60¢

Basket and Trimmers' Tacks—

Lanc.	.....52½¢
S. S.	.....60¢
Hungarian Nails	.....60¢
Common and Patent Brads	.....55¢
Leathered Tacks	.....10¢
Brush Tacks, S. S.	.....60¢
Looking Glass Tacks, S. S.	.....35¢
Picture Frame Points, S. S.	.....35¢
Finishing Nails	.....60¢
Trunk and Clout Nails—	
Black	.....62½¢
Tinned or Coppered	.....60¢5¢
Basket Nails	.....60¢
Chair Nails	.....52½¢
Cigar Box Nails	.....45¢
Tin Capped Nails	.....50¢

Extra discount 25¢25¢

Miscellaneous—

Double Point	.....90¢90¢10¢
Wire Carpet Nails	.....50¢10¢
Claw Handle Carpet	.....# gross \$4.00
Bonnie Blue	.....# box 1.50
Bill Nye Brad Box	.....4.00
Parlisan Gilt Nails, cartoon	.....50¢
Upholsterers' Nails	.....50¢

Wire Brads and Nails—

Steel-Wire Brads, R. & E. Mfg. Co.'s list

See also *Nails, Wire.***Tanks, Oil—**

Emerald, S. S. & Co.: 30-gal.	.....\$8.75; 60-gal., \$11 each
American	.....40¢40¢5¢
Spring	.....40¢
Chesterman's, Regular list	.....25¢30¢

Tapes, Measuring—

Thimble Skeins—See <i>Skeins.</i>	
Ties, Bale—Steel.	
Standard Wire, list	.....50¢10¢5¢

Tinners' Shears, &c —

See <i>Shears, Tinners' &c.</i>	
Tinware—	
Stamped, Jannaped and Piced, list Jan 20, 1887	.....70¢10¢@70¢25¢

Tire Benders, Upsetters, &c.—See *Benders and Upsetters, Tire.***Tobacco Cutters—**See *Cutters, Tobacco.***Tools—**

Coopers—	
Bradley's	.....20¢
Barton's	.....20¢20¢5¢
L. & I. J. White	.....20¢5¢
Albertson Mfg. Co.	.....25¢
Beatty's	.....30¢
Sandusky Tool Co.	.....30¢30¢5¢
Shaves Cincinnati Tool Co.	.....20¢

Lumber—

Ring Peavies, "Blue Line"	.....# doz \$20.00
Ring Peavies, Common	.....# doz \$18.00
Steel Socket Peavies	.....# doz \$21.00
Mail, Iron Socket Peavies	.....# doz \$19.00
Cant Hooks, "Blue Line"	.....# doz \$16.00
Cant Hooks, Common Finish	.....# doz \$14.00
Cant Hooks, Mail, Socket Clasp, "Blue Line" Finish	.....# doz \$16.00
Cant Hooks, Mail, Socket Clasp, Common Finish	.....# doz \$14.50
Cant Hooks, Clip Clasp, "Blue Line" Finish	.....# doz \$14.00
Cant Hooks, Clip Clasp, Common Finish	.....# doz \$12.00
Hand Spikes	.....# doz 6 ft., \$15.00; 8 ft., \$20.00

Pike Poles, Pike & Hook	.....# doz, 12 ft., \$11.50; 14 ft., \$12.50; 16 ft., \$14.50; 18 ft., \$17.50; 20 ft., \$21.50
Pike Poles, Pike only	.....# doz, 12 ft., \$10.00; 14 ft., \$11.00; 16 ft., \$13.00; 18 ft., \$16.00; 20 ft., \$20.00
Pike Poles, not ironed	.....# doz, 12 ft., \$6.00; 14 ft., \$7.00; 16 ft., \$9.00; 18 ft., \$12.00; 20 ft., \$16.00
Setting Poles# doz, 12 ft., \$14.00; 14 ft., \$16.00; 16 ft., \$17.00
Swamp Hooks# doz \$18.00

Saw—

Atkins, new list40¢
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Transom Lifters—See *Lifters, Transom.***Traps—**

Game—	
Newhouse40¢40¢5¢
Onedia Pattern70¢10¢
Game, Blake's Patent	.....40¢10¢5¢

Mouse and Rat—

Mouse Wood, Choker# doz holes, 9@10¢
Mouse, Round Wire	.....# doz \$1.50 10¢
Mouse, Cage, Wire	.....# doz \$2.50 10¢
Mouse, Catch-em-alive	.....# doz \$2.50 15¢
Mouse, Bonanza	.....# doz 0.90@1.00
Rat, Decoy	.....# gr \$10.00, 10¢
Ideal	.....# gr \$10.00
Cyclone	.....# gr \$5.25
Hotchkiss Metallic Mouse, 5-hole traps	.....# doz \$5.00
Hotchkiss Imp. Rat Killer	.....# doz \$18.50
Hotchkiss New Rat Killer# doz \$18.50
Schuyler's Rat Killer# doz \$15.00
Dandy# doz, \$1.75

Triers—

Butter and Cheese25¢
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Trimmers, Spoke—

Bonney's# doz \$10.00, 50¢
Stearns'20¢10¢
Ives', No. 1, \$15.00; No. 2, \$12.00# doz \$15.00; No. 2, \$12.00
Douglas'	.....# doz \$9.00, 20¢
Cincinnati	.....25¢

Trowels—

Lothrop's Brick and Plastering	.....20¢10¢5¢35¢
Reed's Brick and Plastering	.....15¢
Diston's Br'k and Plastering	.....25¢25¢10¢

Whips

American Whip Co.: Length.	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8 ft.
f. X. L. Whalebone Driving.	\$18.00	20.00	22.00	24.00	27.00	30.00	33.00	36.00
Eureka, Two-thirds Whalebone.	15.00	16.50	18.00	20.00				
Bull Bone, Half-length Whalebone.			11.00	12.00	13.00	15.00		
American Standard.	8.00	8.50	9.50	10.50	12.00	13.50	15.00	16.50
True Grip, Raw Hide Center.	6.00	6.00	6.50	7.00	7.50	9.00		
New Name, Stocked Java, Black and Wine Colors.				6.00				
Americus, 95 Pen Whip.				6.00				
Gents' Light Driving No. 111.				5.00				
Gents' Light Driving No. 108.				5.00				
Hand-made Stocked Java No. 103.			3.75	4.00				
A large variety of cheaper grades.							50¢@83.00	
Team Whips.							\$2.00@87.50	
Toy Whips.							\$2.50@12.00	
Hardware Assortment, 10 American, 75 Whips for \$50.00.								

Wire and Wire Goods—**Iron—****Market,**

Br. & Ann. Nos. 0 to 18.	75¢@75¢10¢5¢
Cop'd. Nos. 0 to 18.	75¢@75¢10¢5¢
Galv. Nos. 0 to 18.	70¢@70¢10¢
Tin'd. Tin'd list, Nos. 0 to 18.	70¢@70¢10¢

Stone, Br. and Ann'd, Nos. 16 to 18.	80¢
Bright and Ann'd, Nos. 19 to 26.	80¢5¢
Br. and Ann'd, Nos. 27 to 36.	82¢@85¢
Tinned Broom Wire, 18 to 21.	43¢
Galvanized Fence, Brass, list Jan. 18, 1884.	75¢@10¢
Copper, list Jan. 18, 1884.	40¢@5¢
Annealed Wire on Spools.	60¢

Extra 10¢ often given.

Mallin's An'aled & Tin'd on Spools. 50¢@5¢
 Mallin's Brass and Cop. on Spools. 50¢@5¢
 Tate's Spooled, Tin'd & Annealed. 60¢@5¢
 Tate's Spooled Cop. and Brass. 50¢
 Cast Steel Wire. 50¢
 Stub's Steel Wire. 50¢
 Steel Music Wire, 12 to 30, imported. 60¢@70¢

Wire Clothes Line, see Lines.

Wire Picture Cord, see Cord.

Bright Wire Goods—

Standard list. 80¢@20¢85¢

Wire Cloth and Netting—

Painted Screen Cloth, good quality. 100 sq. ft. \$1.40

Galvanized Wire Netting. 75¢@75¢10¢

Wire, Barb—

See Trade Report.

Wire Rope—See Rope, Wire.**Wire Goods—**

American Adjustable. 40¢

Baxter's Adjustable "S". 40¢@10¢50¢

Baxter's Diagonal. 80¢

Coe's Genuine. 50¢@3¢

Coe's "Mechanics". 50¢@10¢3¢

Girard Standard. 65¢@10¢70¢

Lamson & Sessions' Engineers'. 60¢@10¢

Lamson & Sessions' Standard. 70¢@10¢

P. S. & W. Agricultural. 75¢@10¢80¢

Girard Agricultural. 75¢@10¢80¢

Lamson & Sessions' Agric'l. 75¢@10¢80¢

Whitman & Barnes Mfg. Co. 75¢@10¢80¢

Bemis & Call's:	
Pat. Combination.	40¢
Merrick's Pattern.	35¢
Briggs' Pattern.	25¢
Cylinder or Gas Pipe.	40¢@5¢
No. 3 Pipe.	50¢
Aiken's Pocket (Bright).	\$3.00, 50¢@10¢
The Favorite Pocket.	\$4.00, 40¢
Webster's Pat. Combination.	25¢
Boardman's.	30¢
Always Ready.	25¢@5¢
Alligator.	50¢
Donohue's Engineer.	20¢@10¢
Eagle.	50¢@10¢
Acme, Bright.	50¢@2¢
Acme, Nickel.	40¢@2¢
Hercules.	70¢@70¢2¢
Walker's.	55¢@2¢
Diamond Steel.	55¢@2¢
Cincinnati Brace Wrenches.	25¢@10¢
Taft's Vise Wrench.	55¢@10¢2¢

Wringers, Clothes—

Am. Wringer Co.'s list, Jan. 2, '93. 2¢ cash

Colby Wringer Co., list Sept. 1, '91. 2¢ cash

Lovell Mfg. Co., list Jan. 1, 1892. 2¢ cash

Peerless Mfg. Co., list Feb. 1, 1892. 2¢ cash

National Wringer & Mfg. Co., list June 1, 1892. 2¢ cash

Wrought Goods—

Staples, Hooks, &c., list March 17, 1892. 85¢@10¢85¢15¢

Paints, Oils and Colors.—Wholesale Prices.**Animal and Vegetable****Oils—**

Linseed, City, raw, per gal.	@ 48
Linseed, City, boiled.	@ 51
Linseed, Western, raw.	@ 48
Lard, City, Extra Winter.	@1.07 1/2
Lard, City, Prime.	@1.05
Lard, City, Extra No. 1.	75 @ 80
Lard, City, No. 1.	65 @ 70
Lard, Western, prime.	1.00 @
Cotton-seed, Crude, prime.	49 @ 50
Cotton-seed, Crude, off grades.	45 @ 47
Cotton-seed, Summer Yellow, prime.	56 @ 58
Cotton-seed, Summer Yellow, off grades.	53 @ 55
Sperm, Crude.	@ 95
Sperm, Natural Spring.	@
Sperm, Bleached Spring.	@
Sperm, Natural Winter.	1.00 @1.03
Sperm, Bleached Winter.	1.05 @1.08
Whale, Crude.	@ 55
Whale, Natural Winter.	@ 56
Whale, Bleached Winter.	@ 58
Whale, Extra Bleached.	@ 60
Sea Elephant, Bleached Winter.	@
Menhaden, Crude, Sound.	40 @
Menhaden, Crude, Southern.	@
Menhaden, Light Pressed.	42 @ 43
Menhaden, Bleached W'ter.	45 @
Menhaden, Extra Bleached.	48 @
Tallow, City, prime.	70 @ 75
Tallow, Western, prime.	65 @ 70
Cocanut, Ceylon.	69¢ @ 74
Cod, Domestic.	38 @ 40
Cod, Foreign.	42 @ 45
Red Elaine.	40 @ 45
Red Saponified.	74¢ @ 8
Bank.	40 @ 41
Straits.	41 @ 42
Olive, Italian, bbls.	65 @
Neatsfoot, prime.	80 @ 90
Palm, prime, Lagos.	64¢ @ 6 1/2

Mineral Oils—

Black, 29 gravity, 25 @ 30 cold test.	7 @ 7 1/2
Black, 29 gravity, 15 cold test.	7 1/2 @ 8
Black, 29 gravity, summer.	6 @ 6 1/2
Cylinder, light, filtered.	14 @ 16

Cylinder, dark, filtered.	10 @ 13
Paraffine, 23 1/2 @ 24 gravity.	11 @ 12
Paraffine, 25 gravity.	10 @ 11
Paraffine, 28 gravity.	7 1/2 @ 8
Paraffine, red.	1 1/2 @ 10 1/2

Paints and Colors—

Barytes, Foreign, 10 ton.	\$22.00 @24.00
Barytes, Amer. floated.	\$29.00 @32.00
Barytes, Amer. No. 1.	16.00 @18.00
Barytes, Amer. No. 2.	13.00 @15.00
Barytes, Amer. No. 3.	11.00 @12.00
Blue, Celestial.	40 @ 50
Blue, Chinese.	40 @ 50
Blue, Prussian.	25 @ 40
Blue, Ultramarine.	8 @ 25
Brown, Spanish.	3 1/2 @ 1
Brown, Vandyke, Amer.	3 @ 3 1/2
Brown, Vandyke, English.	6 @ 8
Carmin, No. 40, in bulk.	3.10 @
Carmin, No. 40, in boxes or barrels.	3.20 @
Carmin, No. 40, in ounce bottles.	4.20 @
Chalk, in bulk.	\$ ton. 2.00 @
Chalk, in bbls. \$ 100 b.	33 @ 40
China Clay, English.	\$ 13.00 @18.00
Cobalt Oxide, prep'd.	9.00 @11.00
Cobalt Oxide, black.	lots 100 b. 1.90 @
Cobalt Oxide, black.	less 100 b. 1.96 @
Green, Paris, in bulk.	10 @ 10 1/2
Green, Paris, 170 @ 175 b.	10 @
Green, Paris, small pack.	10 1/2 @ 11
Green, Chrome, ordinary.	6 @ 12
Green, Chrome, pure.	22 @ 25
Lead, Eng., B.B. white.	8 1/2 @ 10
Lead, Amer. White, dry or in oil.	7 @ 7 1/2
Kegs, lots less than 500 b.	6 1/2 @ 6 3/4
Kegs, lots 500 b to 5 tons.	6 1/2 @ 6 3/4
Kegs, lots 5 tons to 12 tons.	6 1/2 @ 6 3/4
Kegs, lots 12 tons and over.	6 1/2 @ 6 3/4
Lead, White, in oil, 25 b tin pails, add to keg price.	@ 1 1/2
Lead, White, in oil, 12 1/2 b tin pails, add to keg price.	@ 1
Lead, White, in oil, 1 to 5 b assorted tins, add to keg price.	@ 2 1/2
Lead, Red, bbls. and 1/2 bbls.	6 @ 7
Lead, Red, kegs.	6 1/2 @ 7 1/2
Litharge, kegs.	6 1/2 @ 7 1/2
Litharge, bbls. and 1/2 bbls.	6 @ 7

TERMS, &c.—Lead and Litharge.—On lots of 500 b or over, 60 days' time or 2 1/2 % discount for cash if paid within 15 days of date of invoice.

Ocher, Rochelle.	1.35 @ 1 1/2
Ocher, French Washed.	1 1/2 @ 2 1/2
Ocher, German Washed.	1 1/2 @ 2 1/2
Ocher, American.	1 1/2 @ 1 1/2
Orange Mineral, English.	8 1/2 @ 9
Orange Mineral, French.	10 @ 10 1/2
Orange Mineral, German.	8 1/2 @ 9
Orange Mineral, American.	8 1/2 @ 8 1/2
Paris White, English Cliff.	1.00 @1.15
Paris White, American.	65 @ 75
Red, Indian, English.	5 1/2 @ 7
Red, Indian, American.	2 @ 6 1/2
Red, Turkey.	9 @ 14
Red, Tuscan.	9 @ 11
Red, Venetian, American.	\$ 100 b. 1.00 @1.10
Red, Venetian, English.	\$ 100 b. 1.20 @1.35

Sienna, Italian, Burnt and Powder.	4 @ 5
Sienna, Ital., Burnt Lumps.	1 1/2 @ 3 1/2
Sienna, Ital., Raw, Powder.	4 1/2 @ 5 1/2
Sienna, Ital., Raw, Lumps.	1 1/2 @ 3 1/2
Sienna, American, Raw.	1 1/2 @ 1 1/2
Sienna, American, Burnt and Powdered.	1 1/2 @ 1 1/2
Talc, French.	1 1/2 @ 1 1/2
Talc, American.	1 1/2 @ 1 1/2
Terra Alba, Fr'ch. \$ 100 b.	95 @1.25
Terra Alba, English.	70 @ 80
Terra Alba, American No. 1.	65 @ 75
Terra Alba, American No. 2.	45 @ 50

Umber, Turkey, Burnt and Powdered.	\$ 100 b. 3 1/2 @ 4
Umber, Turkey, Bnt. Ln.	2 1/2 @ 3
Umber, Turkey, Raw and Powdered.	3 1/2 @
Umber, Turkey, R'w Lumps.	2 1/2 @ 2 1/2
Umber, Turkey, Bnt. Amer.	1 1/2 @ 1 1/2
Umber, Turkey, R'w Amer.	1 1/2 @ 1 1/2
Yellow, Chrome.	10 @ 25
Vermilion, American Lead.	11 1/2 @ 12
Vermilion, Quicks'g, bulk.	57 @
Vermilion, Quicks'g, bags.	58 @
Vermilion, Quicksilver sm'r pks.	62 @
Vermilion, English Import.	85 @ 90
Vermilion, Imitation, Eng.	8 @ 35
Vermilion, Trieste.	90 @ 92 1/2
Vermilion, Chinese.	92 1/2 @ 95
Whiting Common, \$ 100 b.	37 1/2 @ 42 1/2
Whiting Gliders.	45 @ 55

Zinc, American, dry.	\$ 100 b. 4 1/2 @
Zinc, French, Red Seal.	7 1/2 @
Zinc, French, Green Seal.	9 @
Zinc, French, V. M. X.	@ 7
Zinc, Antwerp, Red Seal.	7 1/2 @
Zinc, Antwerp, Green Seal.	7 1/2 @
Zinc, German, L. Z. O.	6 1/2 @ 7 1/2
Zinc, V. M. in Poppy Oil, G. Seal, lots of 1 ton and over.	10 1/2 @ 11 1/2
lots less than one ton.	11 @ 11 1/2
Zinc, V. M. in Poppy Oil, Red Seal.	10 @ 10 1/2
lots of less than 1 ton.	10 1/2 @ 10 1/2
Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1 1/2; 25 bbls. 2 1/2; 50 bbls. 4. No discount allowed on less than bbl. lots.	

Colors in Oil—

Black, Drop, Frankfort.	25 @ 30
Black, Drop, English.	12 @ 15
Black, Drop, Domestic.	7 @ 10
Black, Lampblack, Best.	20 @ 35
Black, Lampblack, Common.	7 @ 18
Black, Ivory.	8 @ 15
Blue, Chinese.	35 @ 40
Blue, Prussian.	20 @ 45
Blue, Ultramarine.	12 @ 18
Brown, Vandyke.	7 @ 12
Green, Chrome.	8 @ 13
Green, Paris.	16 @ 18 1/2
Sienna, Raw.	7 @ 14
Sienna, Burnt.	7 @ 14
Umber, Raw.	7 @ 10
Umber, Burnt.	7 @ 10

Putty—

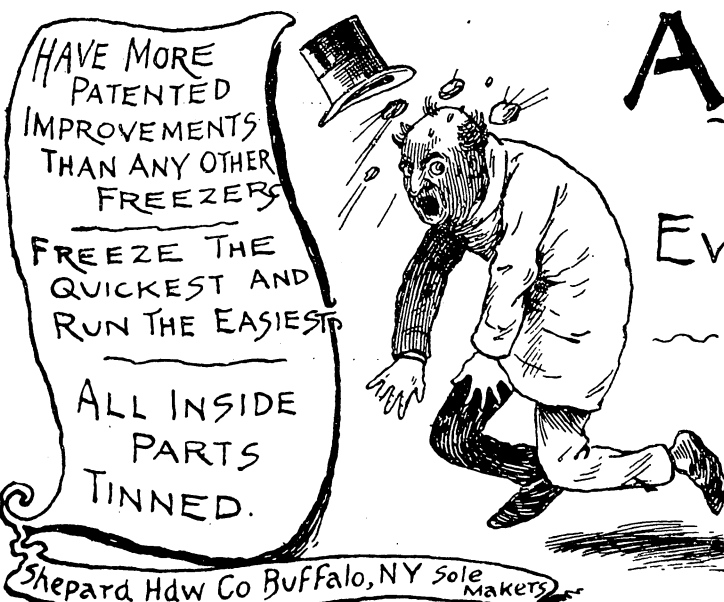
In barrels and 1/2 bbls.	.013¢ @ .014¢
In tubs.	.015¢ @ .016¢
In tin cans.	.015¢ @ .016¢
In bladders.	.015¢ @ .016¢

Spirits Turpentine—

In regular bbls.	@ 34 1/2
In machine bbls.	@ 35

Glue—

Low Grade.	\$ 100 b. 8 @ 10
Cabinet.	12 @ 14
Medium White.	13 @ 15
Extra White.	17 @ 20
French.	10 @ 22
English.	10 @ 15
Irish.	12 @



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OF COURSE.

EVERYBODY KNOWS THAT

Shepard's
Lightning Freezers

HAVE HIT THE

POPULAR FANCY.

Pacific Coast Representatives, CHAS. L. PIERCE & CO., 203 Market St., SAN FRANCISCO, CAL.

Canadian Representative, H. D. SIMMONS, 85 York St. TORONTO, ONT.

MARCH 1, 1893.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

Bar Iron from Store—

List January 17. 1884.

Fine Numbers.

— % discount.
Spring Wire, 2¢ @ in advance.

Per D.		Per D.	
No. 5.....	49¢	No. 11.....	56¢
No. 6.....	49¢	No. 12.....	58¢
No. 7.....	49¢	No. 13.....	60¢
No. 8.....	50¢	No. 14.....	65¢
No. 9.....	62¢	No. 15.....	70¢
No. 10.....	54¢		
60¢ @ 5% discount.			

Drawn Roas for Bolts, Forgings, &c.

1/4 to 3/8 inches inclusive.....	17¢	3	3
Over 3/8 to 5 inches inclusive.....	18¢	3	3
<i>Piston Rods, Finished True, Smooth and Straight.</i>			
1/4 to 3/8 inches inclusive.....	18¢	3	3
Over 3/8 to 5 inches inclusive.....	19¢	3	3

Duty: Pig, Bars and Plates, \$1.50 @ 100 lb.
Western Spelter.....5¢@54¢
Bertha (pure).....8¢@34¢

Duty : Sheet, 21½¢ @ lb.	
600 lb casks	63½¢
Per lb.....	7 ¢

Duty : Pig, \$2 @ 100 lb.	Old Lead, 2¢ @ lb.	Pipe
and Sheets, 2½¢ @ lb.		
American Pig.....	4.2¢ @ 4.50¢	
Bar.....	4.2¢	
Pipe, subject to discount 20%.....	6.2¢	
Tin-Lined Pipe, subject to discount 20%....	1.5¢	
Block Tin Pipe, subject to discount 20%....	37½¢	
Sheet, subject to discount 20%.....	7¢	
Old Lead in exchange, 3½¢ @ lb.		

1/2 @ 1/2 (Guaranteed).....	13 1/2¢ @ 15¢
No. 1.....	11 3/4¢ @ 12 1/2¢

Prices of Solder indicated by private brands vary according to composition.

Cookson 121½¢
Hallett's 10¾¢

Duty: 15¢ per lb.	
Guaranteed over 98½% pure.....	¢ lb .75
Guaranteed 94½@98½% pure.....	¢ lb .65
Lots under 100 lb.....	5¢ per lb additional

Prices Paid in New York.

Heavy Copper	#	10	
Light and Tinned Copper	#	9	
Heavy Brass	#	8	
Light Brass	#	7	
Lead	#	3	
Tea Lead	#	3	
Zinc	#	3	
No. 1 Pewter	#	14	
No. 2 Pewter	#	7	
Wrought Scrap Iron	# GROSS	ton	\$17.00
Heavy Cast Scrap	# GROSS	ton	10.00
Light Cast Scrap	# GROSS	ton	8.00
Pure Iron	# GROSS	ton	5.00

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